ARCHIVES OF OTOLOGY.

LYMPHOMA OF THE TONSILS.

By E. CRESSWELL BABER, M.B., Lond.

SURGEON TO THE BRIGHTON AND SUSSEX THROAT AND EAR HOSPITAL.

THE rarity of this affection leads me to publish the following notes of a case recently under my care, although they are not as full as I could wish:

Matilda N., aged 14, a tall, thin child, was admitted an out-patient at the Throat and Ear Hospital on May 15, 1890, suffering from what appeared to be great hypertrophy of the tonsils, which was said to have existed for two years. They were both abscissed with the guillotine and did not bleed much. Subsequently, one or two smaller pieces were removed (about July) from the right tonsil, one of which projected from the lower part of the tonsil, over the epiglottis. Before her admission she suffered from swellings in the groins. She remained away for some weeks, and returned on Nov. 24th, with the tonsils much enlarged again, the right one presenting an irregular surface, with ulceration on the right anterior pillar and adjacent part of the palate. Nov. 25th she was admitted as an in-patient, and portions of the growth in the right tonsil, which was the larger of the two, were removed with the guillotine, bistoury and snare on different occasions. Arsenic was also prescribed internally, and finally, as the breathing and deglutition were considerably impeded, especially by the lower portions of the growth, on Dec. 28th, under general anæsthesia I scraped out as much as possible of the right growth with a gland scoop, with considerable relief to the respiration and deglutition.

During my absence from home the patient then came under the care of my colleague, Dr. Scatliff, and for the following notes I am indebted to my friend, Mr. George Morgan.

"Feb. 5, 1891. Losing flesh rapidly. Glands on the right side of the neck are much larger, the size of a small orange. The inguinal glands are also much enlarged, though they vary in size

from time to time. Tumor of right tonsil now as large as ever. The left tonsil is also much enlarged, leaving only a narrow passage between the two. Enlarged glands in axilla.

"April 28th. Very emaciated. There is now a mass of glands on the right side of the jaw as large as a cricket ball. In each groin there is a mass even larger than that on the right side of the neck. The tonsils still keep enlarging. To-day Dr. Scatliff removed a large mass from each tonsil, partly with the guillotine, but principally by scraping with a curette. Last night, before the operation, the patient could only breathe in the erect posture. After operation breathing much freer.

"May 8th. Patient died of pneumonia. The day before death all the enlarged glands disappeared, the large mass in the axilla, groin, and neck all vanished, leaving the groins as flat as in the natural state."

There was no *post-mortem* examination. As regards the family history, it was stated that two sisters were in consumption, and that one had a running abscess in the neck with enlarged glands.

A microscopic examination of some portions removed during life from the tonsil was made by Dr. Chaffey, who reported as follows:

"Microscopic examination of a portion of the growth removed from the tonsil reveals a well-developed reticulum, somewhat delicate, and presenting a great number of endothelial plates. Numerous lymphoid cells, resembling white blood corpuscles are enclosed in its meshes. In some parts of the section these cells appear to predominate, together with a sprinkling of small round cells, whilst the amount of reticulum is relatively diminished. These appearances point to the growth being of the nature of a rapidly growing lymph-adenoma rather than lympho-sarcoma."

Remarks: The growths in the tonsils in this case, although they assumed such enormous proportions, were apparently only a local manifestation of a general disorder, such as lymph-adenoma, or possibly leukhæmia. The blood was not examined.

Morell Mackenzie[1] records three cases of lymphoma of

[1] "Diseases of the Throat," German edition, vol. i., p. 108.

the tonsil occurring in men aged 57, 27, and 32 years respectively. In the first case the disease was bilateral, and the cervical glands were affected; in the others it was unilateral, and there is no mention of lymphatic glands being affected. The early implication of distant glands in the present case, as well as the bilateral character of the affection, pointing to a constitutional disorder, did not justify any attempt at a radical removal of the growth. The surgical treatment could, therefore, only be palliative to relieve the difficulty of breathing and deglutition.

ON THE STRUCTURE OF AURAL POLYPI.

By RICHARD LAKE, F.R.C.S., London, Eng.

(*With two figures.*)

THE histological structure of aural polypi has been considered by aural surgeons to be one of considerable interest, but partly no doubt, on account of the less perfect methods of investigation at command, its study has not, until recently, led to any very definite results.

At the date of publication of Dr. Klingel's paper on this subject,[1] I was myself engaged in collecting material with the same object in view. The results I have arrived at are so very similar to those attained by Dr. Klingel, that for some purposes, especially as to the number and relative frequency of each variety, the two papers may be taken together, and the present communication used to confirm Dr. Klingel's (the first) results.

The most noticeable features of each report are the references made to the frequent appearance of myxomatous tissue, the origin of which is far from clear, though future careful investigation of the so-called "pedunculated structures"[2] may possibly decide this point. Another matter worthy of attention is the great similarity in the structure of aural polypi to scar tissue in various stages of growth, a similarity which, to a certain extent, bears out the theory advanced by some, that these tumors are usually exuberant granulations, due generally to caries of the subjacent bone.

The polypi were all from cases of middle-ear catarrh, with

[1] Archives of Otology, vol. xx., No. 2, p. 142.
[2] Gruber, "Diseases of the Ear" (English translation), p. 78.

suppuration, except in one instance (a myxofibroma), in which there was a history of six months' deafness without discharge, following acute otitis media with perforation. In neither report are any malignant polypi included.

GRANULOMATA.

Four Cases. In only one of these was there any trace of a capsule; it was then seen to be formed of delicate fibres; in all vessels were numerous; in one true connective tissue was found in considerable quantity; in none was there any trace of epithelium.

FIBROMATA.

Soft or early fibromata—two cases. In one, cysts lined with epithelium were found; the epithelial covering in both was squamous and of some thickness.

Firm or older fibromata—two cases. One also was cystic; the other showed, in a well marked degree, ingrowing columns of epithelium; the epithelial investment was again squamous in both.

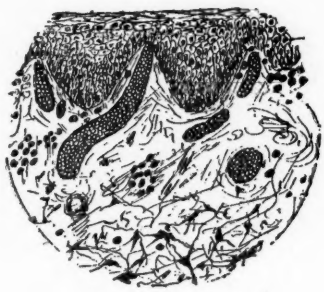

FIG. I.

Section of fibroma myxomatoides; shows the great depth of epithelium, with myxomatous tissue deep in the section and connective tissue, with some pure fibrous tissue between these two tissues. Zeiss E.

FIBROMA MYXOMATOIDES.

Nine cases. One a case in which the polypus had protruded from the meatus for fifteen years; the myxomatous tissue, if in quantity, was central, if in lesser quantity, frequently close to the surface. The fibrous tissue in these,

as in the fibromata, was often penniform or bi-penniform in longitudinal, and circular in transverse section, with generally a central vessel in early stages. Two of the cases contained large cysts without epithelial lining. In six squamous, in one cylindrical, and in two both varieties of epithelium were found.

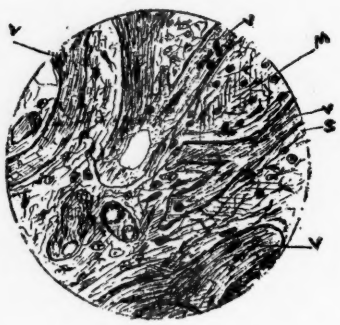

FIG. 2.

Section of angio-fibroma myxomatoides. The vessels (*v*) are mostly cut longitudinally. They are thin-walled, and show the perivascular lymphatic sheath (*s*) in places. (*m*) Myxomatous tissue. Zeiss E.

ANGIO-FIBROMA MYXOMATOIDES.

One case. The apex of the polypus was clothed with squamous epithelium, and contained all the three varieties of tissue, the angiomatous portion being one-sided, and the vessels separated by myxomatous formation; the base was without epithelium, and was composed of granulation tissue.

Remarks.—With regard to the epithelium. In one case of a recurrent growth (myxofibroma), which was sessile, and the total thickness of the growth not more than one fifth of an inch, the epithelium, which was squamous and very thick, showed, in an extremely beautiful manner, the prickles between the cells, thus demonstrating the fact, that polypi can have that variety of epithelium, whilst still practically in the cavity of the tympanum[1]; the columns, which were making their way into the tumors, were in places of such thickness as to form "bird's-nest" arrangements of the cells.[2] The

[1] Weydner, *Zeitschrift für Ohrenheilk.*, xiv. Bd.
[2] Steudener and Kessel, *Arch. für Ohrenheilk.*, iv. Bd., 3 Heft.

degenerative changes undergone by these epithelial columns may possibly account for the formation of some of the cysts occasionally met with. Another method of cyst formation, seen in these tumors, is from mucoid degeneration of granulation tissue, and is most easily studied in fibromata. In these, the granulation tissue becomes included in a meshwork of fibrous bands; these bands are formed around the vessels, the new tissue gradually constricting and compressing the older granulation tissue into more or less oval masses; these now undergo degenerative changes, the cells breaking down, and the intracellular substance becoming mucoid, and forming a series of small cysts, which become eventually one large one by the destruction of the septa.

In two tumors, one a granuloma, the other a fibromyxoma, true connective tissue, in considerable quantities, was found.

I did not observe any tendency to the formation of granulation tissue around the vessels, and in the angiomatous part there was none. In one case a hemorrhage, which was obviously recent, and probably due to injury just prior to removal, was seen.

Gland tissue,[1] though carefully sought for, was not discovered, but the cylindrical epithelium, when forming an ingrowth of a double row of cells, certainly had the appearance of a duct. Plasma cells were present in large numbers in the granulomata and myxofibromata, but not in the pure fibromata. The absence of epithelium outside, and of fibrous tissue inside, the granulomata, suggests the idea that these tissues appear at about the same period in the life history of the polypus.

These observations agree so closely with those of Dr. Klingel, that it is only where I thought I have differed from him, that I have offered any remarks, and I have adhered to his nomenclature throughout.

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[1] Gruber, *loc. cit.*, p. 483.

ON THE SIGNIFICANCE OF THE ODOR OF THE DISCHARGE IN THE TREATMENT OF CHRONIC SUPPURATIVE OTITIS; WITH COMMENTS ON TREATMENT.

By Dr. H. GRADLE, Chicago.

FOR a number of years it has been my habit to notice in every case of suppurative otitis whether the discharge had a fetid odor or not. I have thereby learned that, whenever pus from the middle ear has a fetid smell, the disappearance of that smell is the most sensitive criterion of the efficacy of the treatment. On the basis of about 600 observations I can formulate the following conclusions:

As long as the pus of otorrhœa smells fetid, the treatment employed has exerted no curative influence on the disease; and, conversely,

The first sign of curative influence of any treatment upon the course of an otorrhœa is its effect upon the odor of the discharge.

In order to test for the odor it is only necessary to mop out the meatus with cotton, and smell of the latter. If present, the characteristic fetid odor cannot fail to be recognized. Fresh pus never presents this smell. It may not be odorless; indeed, its smell probably varies with the kind of microbe causing the suppuration. But the characteristic fetor of decomposition is found only when pus has either been pent up at its source or stagnated in the meatus. Whenever we can succeed in thoroughly removing all stale pus, the discharge remains free from fetid odor as long as it does not stagnate again. As it is well known in general

surgery that the most favorable condition for the healing of any purulent inflammation is the free drainage of the pus, the significance of the odor of otorrhœa is evident.

My experience has led me to rely upon the odor when present in otorrhœa as a test of the efficacy of the treatment, according to the following plan. My first treatment in an uncomplicated case of chronic suppurative otitis usually consists in gentle, but thorough, syringing of the meatus, inflation through the Eustachian tube, and application of boracic acid powder. Whether this treatment has had a curative influence or not can be recognized the next or the following day with certainty, by the absence or the persistence of the odor. This, of course, is not the only sign of improvement. Indeed, it has not been a rare experience to find an uncomplicated case practically or nearly cured at the second examination. But no matter whether the subjective sensations or the quantity of the discharge show improvement or not, the removal of a previously existing fetor is always a positive indication of the curative influence of the treatment. If the odor has not been removed, the continuance of the same plan of treatment will prove of no benefit.

Of the therapeutic means mentioned, the removal of the stagnant pus by syringing is the one by which the odor has been abolished. If the mechanical cleansing has not been thoroughly done, the use of boracic acid or any other disinfectant in the meatus does not make the discharge odorless. Strong solutions of carbolic acid may mask the smell, but it returns as soon as the agent is no longer present. The efficacy of proper syringing, without other therapeutic measures, was shown in the following case:

A child of two years had had suppurative otitis for three weeks, and had been treated only with inefficient syringing on the part of the parents. After the cessation of the acute symptoms of the first few days there had been no further improvement. I was called hurriedly one evening when I had no instruments with me. The meatus was filled with fetid discharge. Unable to treat the child at the time, I used only the syringe on hand with tepid water, but *used it thoroughly*. On examination thirty-six hours

later I found a small perforation in the drumhead, but the discharge had ceased entirely since the proper cleansing, and there was, of course, no more odor.

It may be asked what part of the therapeutic result is to be attributed to the boracic acid? While many positive observations as well as an occasional failure by reason of insufficient thoroughness have shown me that the most important part of the treatment is the thorough removal of all stagnating decomposed pus, I have also learned by comparative trials that the time of treatment is materially shortened by the use of antiseptic powders. For between every two successive cleansings pus accumulates in the ear, and the microbes which it contains continue the formation of irritant products, unless their activity is checked by some antiseptic agent. Boracic acid, a feeble antiseptic, can do this only if present in excess. Its antiseptic efficiency and its curative influence are increased by the addition of salicylic acid (about one sixth). (Pure salicylic acid is unpleasantly irritating.) I have tested various other germicides in powder form and as fluids, but have found none superior and scarcely any as convenient as the mixture of boracic and salicylic acids.[1] The instillation of fluid antiseptics, like peroxide of hydrogen, which are not left in the ear permanently, have seemed to me to be in no way superior to mere thorough syringing with pure water.

If the odor is not removed by washing out the meatus, the disease cannot be cured unless other therapeutic means are employed. Sometimes retained pus can be removed by irrigation through the Eustachian tube. This is generally an easy procedure, if both ears are suppurating, in which case the Politzer bag can be used in the usual manner, but filled with warm salt water instead of air. It is more difficult and sometimes even impossible to wash out the tympanum through the Eustachian catheter. On the whole, however, instances in which retained pus can be removed from the tympanic cavity by a current of fluid forced through

[1] I have never met with any results confirming the fears expressed by Schwartze and Staake as to the possibility of damming up the pus by the use of dry powders, as long as these are blown in loosely without tight packing.

the Eustachian tube are not as common as those in which that object can be attained by syringing through a canula inserted into the middle ear. Hartmann's rubber canula is too thick for many cases. The most convenient I find to be the silver tube ordinarily made to fit the hypodermic syringe barrel. It can be used with greater steadiness, if attached to flexible tubing connected with an irrigator. Its use is not restricted to narrow perforations in the drumhead; but it may be of service whenever syringing of the meatus fails to deodorize. It is necessary to curve the tip and to turn it in different directions. Sometimes the purulent focus is in some recess between the ossicles and their ligaments. In such cases an immediate success of the syringing is shown by the appearance of cheesy fragments of pus or cholesteatomatous scales, and their removal checks further odor. If the intratympanic irrigation does not deodorize the discharge, it may be repeated a few times. But unless it ultimately succeeds in removing the smell it is of no further use and other means must be resorted to.

The decision as to what treatment to employ in the case of complications is also facilitated by observing the odor of the discharge. If polypi or granulation tissue dam up the pus mechanically, no treatment except their removal will deodorize the discharge or cure the disease. If, however, irrigation and antiseptic insufflations can render the pus odorless, small polypi and granulations may disappear without surgical treatment and a cure be effected. I can make this statement on the strength of a number of experiences in the cases of timid patients. Undoubtedly, however, the time of treatment is shortened by the removal of polypi and the curetting of granulations.

In the case of exostosis of the walls of the meatus, the surgical indication for their removal hinges on the impossibility to deodorize the pent-up discharge. As soon as the secretion has lost its fetor the otorrhœa can be made to cease.

Carious bone is not an absolute obstacle to a cure of purulent otitis, if the discharge can drain freely, as shown by the absence of odor. But these cases require a long time. I have records of twelve instances in which exposed rough

bone could be felt by the probe in the walls of the meatus or tympanic cavity, or in the attic. After the discharge had been deodorized, the time of treatment varied between four and fifteen weeks, ending with permanent recovery. The bone was probably involved in many more instances, but the caries was either not detected or not sufficiently sought for. It is often difficult to remove the odor in otorrhœa with caries. This is probably due to the existence of crevices or recesses from which pus cannot drain freely. In some instances of caries I have made use of hydrochloric acid according to the suggestion of Ole Bull. A five per cent. solution of the concentrated acid was left in the ear fifteen minutes or as long as the patient could stand it. This was repeated at every visit, on perhaps three to six successive days, until the pus was free from odor. A number of times I have thus succeeded in doing away with the foul odor which had resisted intratympanic irrigation. After the discharge had become odorless I could not see any further benefit from the further use of hydrochloric acid.

In other instances, in which caries and stagnation of decomposed pus co-existed, I succeeded in reaching the seat of the disease by making use of the penetrating power of alcohol or alcohol and ether. By reason of their low surface-tension, these fluids can pass through clefts which water cannot enter. An alcoholic ethereal solution of iodoform (perhaps more active if containing salicylic acid), can thus penetrate into recesses filled with thick or cheesy pus. We thereby get the specific influence of the iodoform upon the infected tissue, while the coagulated secretion is washed out—either mechanically if the alcoholic solution is injected through the tympanic canula, or flooded out by the serous discharge which the irritant application produces. The pain can be controlled by the previous use of cocaine. After various trials I found that the deodorizing efficacy of the alcoholic ethereal iodoform solutions can be better relied upon, if the instillation is followed by filling the ear with antiseptic glycerine, which is then kept in by a tight plug of cotton. The glycerine may contain carbolic acid (ten to fifteen per

cent.) salicylic or boracic acids, or all three. It is probable that the increased efficacy is due to diffusion between the alcohol in the recess and the glycerine. Antiseptic glycerine solution alone without the previous alcohol or ether instillation cannot deodorize where thorough irrigation with water fails.

After the discharge from a carious ear has been deodorized it changes gradually from a relatively copious purulent to a scant serous secretion. It has seemed to me that this transition occurred more rapidly under the use of alcoholic ethereal solutions of iodoform, followed by the insufflation of dry powder, than when boracic (and salicylic) acid was used without the former. On the other hand, I have long ago learned that iodoform *powder* as such is absolutely inert in any kind of otorrhœa (except perhaps when there is a patch of granulation tissue). On the strength of my experience I would not consent to any resection of carious ossicles until both hydrochloric acid and iodoform solution followed by carbolated glycerine, had been thoroughly tried.

In the case of fistulæ situated in Shrapnell's membrane I have also found the odor — if present — a guide as to the efficacy of the treatment. The discharge in these cases is generally scanty and thin, and apt to dry into crusts covering the perforation. It is necessary to remove these crusts, if adherent, with a probe or dull curette in order to reach the seat of the disease. If necessary a fine canula must be introduced through the fistula and if this is not possible the opening must be enlarged. Even when we have succeeded in deodorizing the discharge, the progress of these cases is often slow, particularly if such crusts continue to form under treatment with dry powders. I have done better in some instances by keeping the ear filled with antiseptic glycerine. Alcoholic ethereal iodoform solutions are also of use in removing the odor in cases of this description, although I am in doubt whether the solvent without the iodoform would not answer as well.

If in any case of otorrhœa the fetor cannot be removed by these various procedures the source of suppuration has

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If in any case of otorrhœa the fetor cannot be removed by these various procedures the source of suppuration has

not been reached and the disease will prove incurable, unless we resort to surgical interference. I have myself never seen an instance of caries of the ossicles which did not heal when the treatment as here described was thoroughly carried out, and hence feel disposed to question the indications for resection of the ossicles. But I do not consider my experience extensive enough to warrant me in generalizing on this subject. In every case of otorrhœa (5) in which I have failed after due efforts in deodorizing the discharge or benefiting the patient, the reason seemed to be involvement of the mastoid cells. I base this view on the copiousness of the discharge, and the apparent integrity of the tympanic walls and ossicles, although no external signs pointed to mastoid disease. While I have never had the opportunity to verify my diagnosis by an operation, the involvement of the mastoid cells without external signs has been definitely proven by Staake.[1] In thirty-three cases of incurable otorrhœa in which he performed his operation of resection of the external wall of the attic and ossicles, and opening of the mastoid cavity from the meatus, he found suppuration in the mastoid cells thirty times. He does not state whether the resected ossicles were found carious in all instances.

Is a cure possible in every case of otorrhœa in which the discharge is free from fetid odor,—in other words, in which there is free drainage of the pus as fast as it is formed? As far as those cases are concerned in which a fetid odor was present originally but was removed by treatment, my experience warrants me in saying, yes! But a minority of patients with otorrhœa never have any odor at all, and the prognosis of this group I would not state quite as definitely without some limitation. Whenever the pus remains free from odor, for the reason that it can drain freely and is so copious that it does not stagnate, ordinary treatment will cure the otorrhœa with certainty. But among the instances of odorless otorrhœa are cases of scant serous discharge coming from the attic through small openings in Shrapnell's

[1] Report of the otological section of the German congress of naturalists in 1891, in *Monatschrift f. Ohrenhlkde.*, No. 11, 1891.

membrane. These often require a long time before they can be cured and sometimes will not yield until the perforation has been enlarged and the curette been applied. Nitrate of silver has also proven of service in some such instances. Tuberculosis of the tympanic walls is also apt to yield an odorless discharge. From actual experience in one instance I do know that an otorrhœal discharge containing tubercle bacilli in a tuberculous subject can heal permanently. In most cases, however, the prognosis would be grave or questionable.

Finally I would emphasize the fact that there is a class of patients with purulent otitis, whose disease, while readily controlled, will relapse with such certainty that treatment limited to the ear alone is scarcely of any benefit. I refer to children with enlargement of the pharyngeal tonsil or chronic suppurative rhinitis, especially when complicated with nasal obstruction. In the former the otorrhœa can be cured, but it is almost sure to return. In the latter class of nasal cases it is often impossible to reach even a temporary cure of the otitis as long as the primary nasal disease continues. Under these circumstances a permanent cure can only be effected by supplementing the aural treatment with correction of the naso-pharyngeal anomalies.

ANTRECTOMY AS A TREATMENT FOR CHRONIC PURULENT OTITIS MEDIA.

By W. ARBUTHNOT LANE, M.S., London.

AS some considerable time has now elapsed since I first suggested and performed the operation which I call antrectomy for cases of chronic purulent middle-ear disease which did not yield to ordinary treatment, I feel that I should now make a general statement as to the subsequent career of these cases after operation, and as to the permanence of the very remarkable improvement in hearing capacity which followed within a very few days upon this treatment, and which was, in many cases, so complete as to defy the detection of any auditory imperfections by the lay observer.

By antrectomy I mean the obliteration of the antrum completely, or if that is impossible, owing to its having acquired considerable dimensions, sufficiently completely to prevent the formation of a cavity or sinus in the same position.

The details of this operation differ from those adopted by Schwartze of Halle, the pioneer in this section of aural surgery, who exposed the antrum through an aperture in the mastoid process, the diameter of which did not measure more than 15 *mm* across. From his description it seems to me that he merely opened and cleared out the antral cavity, and did not of necessity permanently obliterate it, performing an operation of antrotomy rather than antrectomy. Practically, however, antrectomy is but a modification of Schwartze's operation, to whom we are so greatly indebted

for an immense advance in aural surgery. Knapp, Gruber, McBride, and others have also done much excellent work in this direction with more or less success.

I would briefly remind the reader of the several points in reference to this operation to which I have directed attention in previous papers,[1] and some of which I believe are more or less original.

I attempted to demonstrate:

1. That the antrum plays a very much more important part in the pathology and causation of chronic purulent otitis media than is generally recognized. It steadily increases in size and becomes a progressively increasing obstacle to cure by simple methods.

2. That this cavity had only recently received from surgeons, anatomists, or physiologists the attention it deserves, being ignored by or unknown to some, while by others the term was applied to irregular cavities, the mastoid cells, in the substance of the mastoid portion of the temporal bone. In such a recent and elaborate work as Gruber's text-book on diseases of the ear, translated and edited by Messrs. Law and Jewell, I find that the antrum is figured and described as the orifice by means of which the mastoid cells communicate with the back part of the tympanum. No other allusion is made to this structure in the anatomical portion of this work, nor can I find any description of the manner in which the mastoid cells establish, during their development, this supposed communication with the middle ear.

3. That the antrum has no anatomical or physiological relationship with the mastoid process or its cells, but that it

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[1] 1. "Five Complicated Cases of Middle-Ear Disease," *Trans. Clin. Soc.*, 1889.

2. "The Treatment of Suppurative Inflammation of the Mastoid Process Associated with Disease of the Middle Ear," *Brit. Med. Jour.*, March 29, 1890.

3. "Treatment of Chronic Otitis Media," *British Medical Association*, 1890.

4. "The Treatment of Pyæmia Consequent upon Disease of the Middle Ear and Unassociated with Thrombus of the Lateral Sinus," *Brit. Med. Jour.*, January 28, 1890.

5. "Abstract of Clinical Lectures on Inflammation of the Middle Ear and Its Complications," *Lancet*, September 26, 1891.

is situated in the petrous bone, and is physiologically and anatomically a part of the middle ear.

4. That the chief, if not the sole, function of the antrum is to secrete and store up mucus with which to lubricate and moisten the middle ear and its contents, in a manner analogous to the purposes served by the sacculus in the larynx. It varies somewhat in size in different subjects, but, as a rule, it measures about a quarter of an inch in length by an eighth of an inch in depth and breadth.

5. That a considerable number of mastoid processes consist throughout of very dense bone, or of bone containing but a few minute cancelli.

6. That a large number contain only in the apex of the process, and in its vicinity, cavities which vary in size from minute cancelli to cells of considerable size.

7. That in only a comparatively small number does the mastoid bone contain the two groups of large spaces or cells described by anatomists. It has been pointed out by other observers besides myself, that the older ideas as to the mastoid process being made up largely of cells, were absolutely fallacious; and that the presence of dense bone, free from any but the smallest cancelli, is not the result of chronic inflammatory changes—a mistake I have known made very frequently by surgeons. What I think is an anatomical or surgical fact of great importance is, that with chronic purulent otitis unassociated with attacks of tenderness and inflammation of the mastoid process (but accompanied by deep-seated pain in the same side of the head and perhaps also deep in the ear), in fact just such cases as I am calling attention to in this paper,—you are sure or almost sure to find the mastoid process nearly free from cells, and probably also from cancelli; indeed, it is usually composed of dense bone throughout.

8. That in the healthy subject the normal antrum may become continuous with the cells in the mastoid process, owing to their encroaching upon it in their subsequent development. This occasional occurrence accounts probably for the incorrect description of the anatomists.

9. That when a chronic purulent otitis media has existed

for some time, the antrum has increased in size, its cavity being filled with decomposing and irritating caseating secretion, which by its presence causes the progressive absorption and destruction of the wall of the cavity. In this way the dura mater of either fossa, with the lateral sinus, may be exposed, and form a portion of the boundary of the enlarged antral cavity.

10. That the antrum as it increases its area, encroaches more or less upon the mastoid bone, and may establish communication with the mastoid cells if they exist in a high degree of development, these also becoming filled with a material similar to that which is present in the antrum. If, however, the antrum before it had become inflamed were in communication with mastoid cells, the latter of course would participate simultaneously in the inflammatory process.

11. That if the antral cavity be much enlarged, it is perfectly hopeless to attempt with safety to clear it of its foul, tenacious, thick contents by any process of irrigation or operation through the external auditory meatus; and even if it were possible to do this it would be only a matter of a few days or weeks, before the antrum had again become choked with decomposing secretion.

12. That while the enlarged antrum is filled with its irritating contents, aërial conduction may be partly or completely absent, and that within a few days after the operation of antrectomy and cleansing the middle ear, though the patient may have been absolutely deaf in that ear for more than twenty years, ordinary conversation will be heard readily. In such a condition it is just a little difficult to understand by what means the presence of the caseating material in the middle ear and antrum is able to keep the hearing capacity of the internal ear in abeyance, so that within a few days after its removal the acuteness of hearing becomes as keen as ever. It is probable that it acts partly mechanically as a buffer to sounds, and partly by keeping up inflammatory irritation, much as the dry crusts sometimes do in ozæna.

13. That the facial nerve bears a very important relationship to the aperture by means of which the antrum commu-

nicates with the middle ear, since it lies immediately to its inner side, and that any uncertain interference with this aperture may result in permanent damage to the nerve.

14. That the chief function of the membrana tympani is to prevent too rapid evaporation of the secretions of the middle ear and antrum, and that its presence is not necessary in order to hear ordinary conversation with acuteness.

15. That after antrectomy, in order to retain the hearing capacity in the improved condition resulting from the operation, it is necessary to replace the functions of both the antrum and the membrana tympani. The former is done by daily irrigation, and by the introduction of a minute quantity of some antiseptic, as boro-glyceride, or a mixture of glycerine and iodoform, and evaporation is prevented by placing in the meatus a small plug of cotton-wool, or such a cap of compressed wool as that devised by Dr. Ward Cousins.

I have now performed antrectomy a very considerable number of times upon patients suffering from chronic purulent otitis media, and very often from pain, either more or less continuously, or at intervals, over the whole side of the head, or perhaps only over the mastoid process and above the ear; sometimes neuralgic in character, and at other times described as being boring, or throbbing, or like a deep-seated abscess, and very often preventing the patient from lying on that side of the head when in bed. In very many of these cases the patient did not complain of pain or tenderness when the mastoid process was forcibly compressed with the thumb or struck with a pleximeter.

In all or nearly all these cases the antrum was obviously very definitely enlarged—in most cases very considerably so—and, what is a matter of the greatest importance, the mastoid bone hardly ever contained any but the most minute cancellous spaces, but, on the other hand, it was often so dense as to take a good hour's hard work, or more, with gouges and a heavy mallet, to expose the antral cavity.

I am not, of course, considering the conditions that are so common in inflammation of and suppuration about the mastoid process. One has heard of mastoid cells distended with pus being readily opened by the use of even so clumsy and

unsuitable an instrument as the trephine, and then being cleared out with a sharp spoon; possibly, too, the antrum is also found and cleansed, especially if much enlarged, and if communicating with the cells by an aperture of any size.

It is at once obvious that the deep-seated and enlarged antrum, covered almost always in the cases I particularly wish to call attention to, by about three quarters of an inch or more of very dense bone, is infinitely more dangerous to the life of the individual than an antrum in immediate relationship, or in direct communication with large cells in the mastoid bone; since the latter, when inflamed, at once makes itself obvious to the most inexperienced surgeon, and even if he does not interfere, the pus usually escapes externally at last.

That the pain from which the patient with the enlarged antrum suffers is in most cases due to an obvious chronic inflammation of the dura mater in immediate relation with the antrum, I have been able to demonstrate on very many occasions.

By exposing the antrum in such cases, by the careful use of the mallet and gouges, and by scraping the cavity with sharp spoons, and then by subsequent removal of overhanging bone, so as to make the gouged inner wall of the antrum the floor or apex of a cone, the base of which is rendered as broad as possible, in order to remove the sides of the enlarged antral cavity, and by fixing for a considerable time a metal tube, in such a position that its end rests on the obliterated inner wall of the antrum, or, in other words on the apex of the cone, the cavity of the antrum is permanently obliterated, and the floor of the cone becomes filled up with fibrous tissue. The middle ear is then thoroughly cleared of its contents, any relic of the membrana tympani being carefully removed, and the aperture of communication with the antrum is enormously enlarged by the removal of its outer boundary (the whole of the posterior boundary of the external auditory meatus having been already excised when the mastoid process was cut away). In performing this last stage of the operation the greatest care must be taken to avoid any damage to the

facial nerve, and up to the present I have succeeded in doing this. On one occasion the muscles of the side of the face twitched violently, but no damage resulted. I may say that though it has never been my misfortune to damage this structure, it is, I believe, the chief—I may say the only—risk of the operation; yet it is one that would be most distressing to the patient, and should therefore always be in the mind of the surgeon as he is enlarging the aperture into the middle ear.

As regards the subsequent condition of the patient, months or years after the operation, when the simple daily routine of cleaning the ear and introducing a plug into the meatus is followed, the hearing capacity not only retains its improved condition, but often becomes more acute. If, however, the patient is dirty and careless, and pays no attention to the ear after he passes from observation, the hearing capacity gradually diminishes. My experience of the operation is that it is one of the most satisfactory and useful operations that we have in surgery. In skilful hands it is accompanied by practically no risk; it is followed by no pain worth talking of; it absolutely frees the patient from subsequent risk from intracranial complications, if the simple directions as to cleansing, etc., are followed; it removes the foul discharge; the neuralgic pain and tenderness disappear; it almost always cures any existing facial paralysis; it prevents the formation of aural polypi; and it gives the patient back almost perfect hearing, which remains in the same condition or improves, if he takes with it only such small trouble as the ordinary cleanly person habitually devotes to his teeth.

REPORT OF CASES OF DISEASE OF THE MASTOID PROCESS. WITH REMARKS.

By the late Dr. HY. FERRER and Dr. E. S. CLARK, of San Francisco, Cal.

(Article IV., concluded from page 75 of this volume.)

Case 45.—Acute Purulent Inflammation of Left Middle Ear; Empyema Mastoidei; Operation; Cure in Seven Weeks.

E. C. S——, male, forty-six years old. On the 7th of November, 1888, had pneumonia, accompanied by considerable pain over the left side of the head. On the 9th or 10th the left ear began to discharge; after being poulticed for three or four days the discharge increased very much; he could hardly sleep at night on account of pain in the ear. Has been treated by a specialist for the past three or four days.

Status præsens: External meatus filled with purulent discharge, mastoid region slightly swollen; integuments red, sensitive to pressure; walls of meatus almost normal, somewhat macerated; *Mt* red and swollen, details not visible. Patient is very dizzy, cannot walk alone, has to be helped in and out of the carriage. Advised operation at once and sent patient to the German Hospital for that purpose.

December 7, 1888.—*Operation:* Ether narcosis. Had the temporal region thoroughly disinfected, cleaned, and shaved. Incision four to five *cm* long through the normal tissues. Periosteum easily detached from the bone and pushed aside. External surface of the bone normal in appearance, canals for emissary vessels well defined, also the spina supra meatum. In this spot I began to chisel and found the external plate *2 mm* thick when smaller air-cells appeared. I then penetrated to a depth of *2 cm* through a mastoid rich in small air-cells the trabeculæ of which were

very firm. At the depth of 1½ *cm* the sharp scoop was used and at 2 *cm* pus began to ooze out. I had so far made an opening in the bone of almost cylindrical shape and the walls of which felt perfectly hard.

No large cavity that would represent the antrum was met. A forced injection was then tried from the meatus showing that there was no clear communication, but thick pus was noticed to ooze out from the bone. I carefully probed with a steel director, but finding no communication with the cavity I used the sharp scoop until I had reached the depth of 2½ *cm*. The walls being perfectly smooth and hard further interference was then dispensed with. The bone was packed with iodoform gauze, and the lower portion of the wound united with one ligature. Antiseptic dressing applied. Patient recovered immediately from the narcosis. No vomiting.

December 8th.—Had a splendid night without pain, his complexion wonderfully improved, bandage saturated with bright red blood, integuments of mastoid swollen, probably caused by the suture, the hemorrhage, which was severe during the operation, is from a small artery (auricularis post. sup.) which was not ligated. The gauze in the meatus dry but tinged with blood. No discharge. The gauze filling the mastoid was not disturbed. Syringed with carbolic solution and dressed in usual way. Temperature 99°.

December 9th.—Had a very good night, but towards morning some sharp pain in the ear which continued only a few minutes; bandage saturated with blood. The cotton pellet from the meatus perfectly dry. The gauze in the mastoid was removed, the opening syringed thoroughly with carbolized water, but no communication obtained. Will get up. Temperature 98.4°.

December 10th.—During the night he had at times a little pain in the ear; cotton in the meatus dry. Bandage still saturated with blood. The lips of the wound glued together to such an extent that they had to be separated with a probe in order to be able to syringe the fistula in the bone. After removing the gauze from the bone some pus escaped, opening thoroughly syringed with carbolized water, packed with iodoform gauze and bandaged. Was allowed to walk about in the house. Temperature 98.4°.

December 11th, 12th, and *13th.*—Same condition and treatment. On 13th left the hospital and was treated in the office. No discharge in the meatus.

December 14th.—The lips of the external wound granulating, the gauze saturated with pus. In syringing, some muco-purulent

substance escapes from the bone. Last night was the best he has had for the last two months. After syringing, the bone was carefully probed but no sinuses detected. Usual bandage. No discharge from the meatus; *Mt* dull red and thickened.

December 19th.—Patient has been attended daily; occasionally complained of pain in temple; discharge from the bone mucopurulent. The external wound granulating nicely, was to-day thoroughly cauterized with nitrate of silver. There has been no discharge whatever from the meatus.

December 21st.—Rested well at night, though he had considerable pain after treatment yesterday, which continued until night. Prescribed antipyrin to be taken if pain should return. Discharge much less.

December 24th.—In syringing, patient felt fluid in throat; applied a larger drain tube.

December 27th.—Put in an aluminum nail 2 *cm* long. Same treatment.

January 8, 1889.—Daily treatment with but little change, granulations of bone exceedingly slow. Yesterday the nail was somewhat reduced in length and size. In syringing to-day the fluid was felt strongly in the throat. Applied a 12-per-cent. solution of nitrate of silver to the fistula. Nail now 18 *mm* long.

January 18th.—Has had daily treatment. To-day made nail smaller and shorter.

January 21st.—The nail, now $1\frac{1}{2}$ *cm* in length, was left out. The fistula swabbed with a 5-per-cent. solution of carbolic acid and a strip of adhesive plaster placed over the opening.

January 25th.—Same treatment daily. The wound is now entirely closed. Dismissed.

Case 46.—Acute Purulent Inflammation of Left Middle Ear, with Extensive Necrosis of Mastoid; Operation; Cure in Twenty Months.

A. B——, male, age thirty-eight, called at my office December 7, 1888, presenting the following history: On the 6th of November was taken with severe earache on left side; was treated with home remedies a few days, when the ear began to discharge, and has continued discharging ever since, with marked pain in the mastoid region, and at times in the ear and on the temple.

Status Præsens: In meatus profuse purulent discharge; mastoid integuments slightly swollen, sensitive to pressure; external meatus

somewhat narrowed by swelling of lower wall ; in osseous portion a polypus with smooth surface, bleeding easily ; applied several drops of cocaine in meatus, and after half an hour removed small polypus. Syringed with carbolic solution.

December 8th.—Had a better night, but awakened once or twice with some pain ; discharge the same ; granulations cauterized with nitrate of silver.

December 12th.—Has been treated daily by inflations with Politzer and syringing with sublimate 1:1000. The discharge was still as copious and purulent as at first. The osseous portion of the meatus was very much constricted, and bleeds easily. No view of the membrana tympani can be obtained. Sensitiveness of the mastoid very much diminished ; at times he has pain localized at the temple. At home he has been using instillations of hot water. By inflation the air passes freely. Ordered boracic-acid solution in alcohol to drop into the ear.

December 14th.—Discharge still about the same, amount profuse and entirely purulent ; no pain during the night ; has used the drops faithfully ; no pain on pressure on mastoid. Same treatment ; inner portion of meatus appears in same condition.

December 17th.—Same quantity of discharge ; meatus in same condition. Syringed with sublimate 1:1000.

December 21st.—Has been treated daily with inflations, at home boracic alcohol every two hours. Has been affected with dizziness the whole time ; much worse yesterday when I ordered leeches to the tragus. The discharge is thick, purulent, not very profuse ; has not changed by treatment ; the osseous portion of the meatus still constricted but somewhat less, and bleeds easily. With Politzer the air passes freely. Mastoid normal, not sensitive on pressure.

December 22d.—Dizziness greater to-day than before. Patient can now scarcely walk without swaying from side to side, and on rising from a chair almost falls over ; has nausea at the same time. Meatus in same condition. Temperature 100°.

December 26th.—Has had daily treatment, the dizziness steadily growing worse ; slight pain only on pressure on mastoid. An operation advised, and to-day this was performed at the German Hospital. Operation : Incision 4 to 5 *cm* long, parallel to insertion of auricle and 6 *mm* from it.

After penetrating with chisels 1½ *cm* into the bone a quantity of pus escaped, then scoops were used and necrosed bone was

removed, making a cavity the size of a hazel-nut; good communication was obtained, the fluid passing freely into the meatus on syringing through mastoid. Iodoform dressing, bandage. At 7 P.M. temperature 99.2°.

December 27th, 7 A.M.—Temperature 98.4°. Treatment by syringing with carbolic-acid solution and same dressing. Free communication with external meatus.

January 2, 1889.—Same treatment daily at hospital. Temperature normal after the first day; left hospital, and will continue treatment at office.

January 7th.—Daily treatment at office, the wound gradually filling with healthy granulations; to-day applied a lead nail 2½ *cm* long held in place by a head spring.

February 15th.—The cavity is smooth and lined with a white membrane; very little discharge; no discharge from the ear. Scraped the fistula to promote granulation.

April 30th.—Has been attended daily; the cavity scraped but without effect, finally cauterized with nitrate of silver, and after the third day there appeared granulations and the parts were more congested; moderate discharge. The cavity, which was 2½ *cm* deep, at that depth had turned forward for about 1½ *cm* more; now it is almost filled up to the nail. Patient feels better than at any time since the operation, and has no more dizzy spells.

May 2d.—For the last week there has been more discharge coming from above the point of the nail, where a new cavity seems to have formed. To-day considerable discharge, and patient complains of dizziness this morning, and especially on syringing. The mastoid region also swollen, and he complains of pain in the head.

May 17th.—The swelling of mastoid has subsided, and the patient has no more pain, but still considerable discharge; syringed with carbolic solution and cauterized slightly; a few granulations formed at bottom of cavity.

September 30th.—Has been treated daily, as above, but recently, when nitrate of silver is used, it is followed by dizziness, so discontinued its use entirely, and removed the granulations with a wire loop.

October 22d.—Complains of dizziness, general health very poor, low spirits; slight discharge from the fistula, which is kept open by a thick conical nail 2 *cm* long. The fistula itself has smooth

walls and ends with a granulated surface. At the inner third of its upper wall there is a fistula into which a probe can be introduced in the direction upwards and forwards; here the bone is rough and denuded. I introduced a cotton pellet moistened with cocaine, and after a few minutes removed it and incised the entire upper wall from the fistulous opening to the external orifice, then with a small, sharp scoop bent at almost a right angle scraped the bone carefully from within outwards. This was followed by but little hemorrhage and no inconvenience to patient. After syringing with sublimate 1:2500 the nail was inserted and kept in with the head spring.

October 23d.—Still complains of dizziness; the fistula in mastoid syringed with a Hartmann canula, removing some caseous matter; nail, same bandage.

October 24th.—Same treatment as yesterday, less discharge in syringing. There is now better communication with the upper fistula, it being possible to enter and clean the same with the cotton-holder. There is but little discharge. Syringed with carbolic solution.

October 26th.—Changed the nail for a new one curving upwards. The sputum was examined and tubercle bacilli were found. Same treatment.

November 9th.—Had daily treatment; was advised to go to the country, and directions given to his wife as to treatment.

February 24, 1890.—General health improved very much, gained considerable flesh; very little discharge from the meatus, which presents a large conical fistula with external opening 9 *mm* in diameter. With a probe I forced my way upwards and inwards at innermost end of fistula and cauterized thoroughly with silver at end of probe. No discharge whatever from meatus. Felt very dizzy after the cauterization.

May 7th.—Was here twice in March. To-day in syringing mastoid fluid passes into throat.

June 9th.—Another operation advised to complete the closure of the wound.

June 11th.—Operation: A linear incision was made parallel to the insertion of the auricle above and below the fistula, then a horizontal incision connecting this with the external meatus; the external wound was then closed with sutures, and meatus packed with gauze, antiseptic dressing.

June 14th.—Have seen patient at house daily; very little dis-

charge. Treated by cleansing with carbolic-acid solution and iodoform dressing; will go to the country and his wife will continue the treatment.

August 20th.—Has had the wound dressed daily according to directions, coming to the office about once in two weeks; the wound now entirely closed; no discharge from ear. Hearing R h = $\frac{0.4}{5}$, V = $\frac{4}{10}$; L h = $\frac{0.0.2}{5}$, V = $\frac{3}{20}$. Dismissed cured.

CASE 47.—**Chronic Purulent Inflammation of Left Middle Ear, with Abscess of the Mastoid; Three Operations; Patient Still under Treatment.**

C. T——, male, age nine years, seen for the first time January 21, 1889. Had measles over six years ago; several months afterwards the left ear began to discharge, and has continued to do so, with intervals of being perfectly dry. The discharge was never copious, but always very offensive. About a year ago he complained, for the first time, of pain, but never since until last Friday, when he began to complain of pain behind the ear and on the neck when touched; even in eating he experienced pain.

The ear has been syringed by the mother; otherwise no treatment. R. S., accumulatio ceruminis; *Mt*, thickened; L. S., otorrhœa; meatus, normal; mastoid region, sensitive to touch, not swollen; membrana tympani, totally destroyed; in the left middle ear fine granular substance bleeding easily. Ordered the ear to be syringed three times daily with warm water and boracic alcohol.

January 29th.—Complains of intense pain over mastoid; discharge moderate.

February 1st.—Cotton in meatus saturated, and meatus filled with very fetid, cheesy matter. Advised an operation at once, and on consultation with Dr. Morse, operation agreed upon for to-morrow.

February 2d.—Operation by Dr. Morse in the German Hospital (Dr. Clark assisting). Incision about 4 to 5 *cm* long; periosteum pushed back, and chiselling began very close to the meatus. After penetrating the external plate and chiselling about 5 *mm*, cells were found filled with granulations. The opening was enlarged with scoop, and at 1½ *cm* depth a cavity running backwards was found filled with fetid cheesy substance; this was scraped thoroughly, and, on syringing, the fluid passed freely from mastoid to the meatus. Iodoform dressing then applied; bandage.

February 3d.—Temperature 99.2°. Removed gauze from meatus, and syringed, but left mastoid not touched.

February 4th.—Dr. Morse dressed patient, and left him in the hands of Dr. Clark for future treatment.

February 5th.—Patient left hospital and came to office. The meatus still filled with fetid discharge, but not as offensive as before the operation; syringed with sublimate 1 : 1000, the fluid oozing through meatus. Same dressing.

February 6th.—Still purulent fetid discharge from meatus; no communication on syringing; applied rubber drain tube. Same dressing.

February 7th.—The fistula entirely closed at 1 *cm* depth, the rubber tube not penetrating sufficiently to keep it open. A lead nail, curved backwards and 2 *cm* long, was therefore applied after scraping out the granulations.

February 13th.—Same treatment daily, the granulations being scraped from the depths. The discharge is still fetid, but moderate in quantity.

February 17th.—Fistula scraped in the depths, and a nail 2¼ *cm* long, bent so as to fit closely, was inserted; communication obtained with middle ear.

February 18th.—Discharge much less, and without offensive odor; good communication.

March 11th.—Has had daily treatment in usual manner by syringing and occasionally scraping. The wound is now entirely healed, except the opening for nail; the latter has several times been replaced by a shorter one, followed the next day by closure and fetid discharge, making it necessary to reopen communication and apply a nail 2¼ *cm* in length. Now communication is very free, and discharge moderate, with no offensive odor.

March 22d.—Last night the nail came out. On probing found some rough bone at about 2 *cm* depth, and scraped slightly, removing a small piece of the bone.

April 9th.—Has had daily treatment. Three days ago put in a shorter nail to see if fistula would close. To-day no communication; no discharge from ear, but the cotton in meatus has a peculiar fetid odor; slight discharge in fistula, it also having closed in the depths.

May 7th.—Has been treated daily; the fistula was cauterized once or twice, and nail left out; now only a slight opening 1 *cm* deep, and covered daily with small piece of plaster. To-day a small amount of dry discharge in meatus.

June 9th.—No discharge.

June 11th.—Slight discharge from meatus; nail shortened to 1¼ *cm.*

June 18th.—Left out the nail.

June 25th.—Has been treated three times weekly; to-day goes to the country; gave the mother directions for the treatment while away.

September 9th.—For the past month has been coming once a week to office. There was very slight discharge, but this was fetid. To-day the discharge is increased, and also very offensive; syringed as usual, and advised to come daily.

October 1st.—Has had daily treatment by syringing. Now there is very little discharge, but it still has a bad odor.

November 16th.—Slight purulent discharge. No denuded bone can be felt with the probe.

December 14th.—Patient has been coming about once a week. To-day the mother states that on Thursday (12th) the mastoid region began to swell, and the boy complained of considerable pain at the same time. An operation was immediately made.

December 14th.—Operation: Ether being administered, an incision was made, emptying one teaspoonful of thick creamy pus. After careful syringing with carbolic acid, antiseptic dressing was applied. The patient rallied quickly, and was able to go home. He came daily to the office to have his ear syringed, and on the 18th of December was admitted and again operated on by me in the German Hospital.

December 18th.—Operation: After the usual antiseptic precautions had been taken and ether administered, an incision was made alongside of the old callus, down to the bone, the softened tissues pushed aside, and the bone carefully examined. It could be ascertained that the first operation was too superficial, restricted to the external layers of the bone, and directed towards the posterior wall of the meatus before having reached sufficient depth. Back of this defect in the bone was a small sinus, into which a fine probe could be introduced about 2 *cm* deep. The sinus was enlarged with mallet and chisel to the size of over 1½ *cm* in circumference without interfering with the inner portions of the bone. This was filled with fungous granulations, which were scooped out thoroughly until the bone felt hard on all sides, and in the depth towards the middle ear I removed as much as I could. In syringing, very free communication was found to exist. Iodoform dressing. The boy was kept in the hospital three days,

during which period the bandage was changed twice, the first time only partially. During the second change there was already very slight communication.

January 16, 1890.—Has been dressed in office every other day; there has never been much discharge from the wound, and in a few days a nail about 1½ *cm* long was applied. This has been shortened and reduced twice. Communication soon stopped entirely. There is but slight discharge from the meatus, but it still has a very fetid offensive odor.

February 24th.—Fistula in inner part closed; opened with probe and cauterized. Comes to the office once in two weeks.

May 7th.—Calls about every third week. To-day in syringing the mastoid the fluid passes into the throat.

July 14th.—Fistula now entirely closed; left off the spring; very slight discharge in meatus.

[*April* 8, 1891.—Has been treated at home for the past nine months. States that there has been slight discharge all the time, and occasionally it has a bad odor. Now slight fetid purulent discharge from meatus; cleansed with sol. bichlorid. of mercury, and after drying applied powdered aristol.

April 13th.—Has been treated daily in same manner; discharge materially decreased, and no fetor whatever.

May 20th.—No discharge for several weeks past. Dismissed cured.

E. S. Clark, M.D.]

Case 48.—Chronic Otorrhœa of Left Side with Abscess of Mastoid; Operation; Cure in Four Months.

Miss C. F——, age about twenty-five years. On May 10, 1889, was called to the patient's house, found her in bed, and made the following statement: Had otorrhœa when a child (left side), was treated at time; polypus removed from ear and discharge ceased. was not troubled again until several months ago, when discharge reappeared. Has had no treatment. Now suffers intense pain.

Status præsens: The whole mastoid and temporal regions very much swollen; some purulent fetid discharge from ear; the external meatus, however, completely closed by large polypus. Advised an immediate operation to open abscess over mastoid.

May 11th.—Called in Dr. Morse, who, with Dr. Lovelace to give the anæsthetic, opened the abscess and evacuated about eight

ounces of pus. Just preceding that I removed the large polypus from meatus. Filled the cavity with gauze and bandaged.

May 12th.—Removed bandage and syringed with carbolic-acid solution. On syringing the ear large quantities of fetid pus and macerated epidermis came out. On the posterior wall of the meatus was a small opening from which oozed considerable pus, it was in this point that the polypus originated. Patient felt dizzy, and therefore postponed further syringing until to-morrow. Same dressing.

May 13th.—Swelling considerably less; patient much better; more fetid pus and epidermis obtained in syringing, but patient becoming dizzy did not syringe thoroughly. Same dressing.

May 29th.—Has been treated daily at house, the wound gradually closing up until a few days ago a rubber tube was applied to keep it open. There is now a small spot where the bone is denuded of periosteum; to-day applied a nail, keeping it in place with adhesive plaster.

June 4th.—Has been coming to office daily. Same treatment.

August 15th.—Has had daily treatment. About June 15th the discharge from meatus ceased entirely, and the latter now shows a large cavity in its upper posterior portion. The external opening closed about the same time, but the day following there was an accumulation of pus, so it was opened again. Since then it has been gradually filling up until now it is about 2 *cm* deep. Slight discharge daily, is kept open by a nail.

September 13th.—The nail has been gradually shortened. Now it is 1 *cm* long, no discharge. To-day left out nail.

September 17th.—Wound closed entirely.

October 9th.—R. h. = $\frac{6}{6}$, L. = $\frac{3}{6}$. Dismissed.

Case 49.—Acute Purulent Inflammation of Left Middle Ear; Empyema Mastoidei (?); Operation; Cure in Five Weeks.

Mrs. C. H——, age about fifty. Called at office September 27, 1889, complaining of pain and discharge from left ear for about six weeks. Has been treated at St. Mary's Hospital for one month. Only occasionally syringed. No relief.

Status Præsens: Left meatus swollen; very sensitive to touch; considerable muco-purulent discharge. The mastoid region somewhat swollen and denuded of epidermis from application of a blister. Complains of pain and dizziness.

Syringed with carbolic-acid solution, applied zinc oxide plaster to denuded surface, and bandaged.

September 29th.—Same treatment yesterday and to-day, not so much pain, but discharge continues profuse.

September 30th.—Complains of dizziness and considerable more pain in mastoid region, the same being swollen and very sensitive to touch. Same treatment. Applied Priessnitz bandage, and advised patient to go to the German Hospital for treatment.

October 1st.—Patient was so weak that she could hardly come to the office, though ear and mastoid appear the same as yesterday; discharge the same; will go to the hospital to-day.

October 2d.—Dr. Morse was asked to see patient this morning, after examination he advised immediate operation; this was performed in the afternoon by Dr. Morse, who attended patient until October 23d when I took charge of the case.

There was no discharge from the meatus. On mastoid region a large raw surface covered with fungous granulations and producing considerable discharge. This I at once cauterized thoroughly with nitrate of silver. The following day I was astonished to find the patient report that until yesterday she had had continuous pain on that side of the head, which had left her a couple hours after my first treatment. I kept her in the hospital a couple of days longer, cauterizing daily. The granulations receded as well as the discharge, and she was treated as an out-door patient. A short nail was inserted and kept in place for a few days, and when removed the sinus closed at once by contraction of the tissues.

November 5th.—The patient was discharged cured.

Case 50.—Deaf and Dumb from Chronic Bilateral Otorrhœa with Caries of Mastoid, Right Side; Operation; Fistula Still Open when Last Heard from.

R. C——, female, aged fifteen. Physically well developed child. Has been in the institute several years, being deaf and dumb. When three years old had scarlet fever; shortly afterward earache with discharge. Abscess behind right ear. She was then treated and operated on by Dr. Barkan, who removed a piece of loose bone.

Status Præsens: Slight chronic otorrhœa bilateral with total destruction of membrana tympani. In the left ear a small polypus; on the right mastoid region a cicatrix and a fine fistula almost closed, the skin covering it eroded.

December 23d.—Operation: There was on the mastoid an irregular scar with fistulous opening covered with granulations. The soft tissues retracted; the surface of the bone was irregular, and here the caries extended more posteriorly; the anterior portion of the bone was apparently normal. Posteriorly a cavity about 1½ *cm* was formed, anteriorly 2 *cm* in depth was reached without pus and through very dense bone. I desisted from going farther. admitting that the caries was only in the posterior portion of mastoid. Syringed with sublimate 1:1000. Iodoform dressing.

January 2, 1890.—Was treated at hospital until December 31st, when she left, and came to the office to-day. Has had same treatment by syringing and iodoform dressing.

Prescribed sublimate 1:1000 to be used at home for cleansing the meatus and wound.

February 3d.—Has been treated three times a week as above; wound cleansed with sublimate 1:1000 or solution of carbolic acid, and packed with iodoform gauze; cauterized the granulations with nitrate of silver; catheter.

May 7th.—During February came twice a week, and since then once a month; the fistula is gradually filling up, now 1 x 1½ *cm* in size and 1 *cm* deep; has had treatment with occasional cauterizations. Is treated at home by cleansing with carbolic acid 1 to 100, and gauze dressing as instructed.

June 7th.—Fistula has scarcely decreased in size; still moderate purulent discharge; no discharge from meatus; patient will return home and her mother will attend to the ear according to directions.

[*May 15th*, 1891.—Patient has not been seen since June 7, 1890. E. S. C.]

Case 51.—Acute Purulent Inflammation of Right Middle Ear with Caries of Mastoid; Operation; Cure in Seven Weeks.

R. G——, female, age five. First seen on March 15, 1890. Has had a discharge from the right ear for two or three weeks, during which period the child was treated by a physician in Berkeley. When brought she had moderate discharge from the meatus and considerable fluctuating swelling on mastoid. I sent her at once to the German Hospital and operated in the afternoon. Ether narcosis. Incision as usual; tissues thickened; granulation on inner surface. In external plate a perforation which was enlarged;

it was about 2 *cm* from the posterior wall of the external meatus and the external plate was undermined posteriorly. In enlarging the cavity the anterior portion of the mastoid, the usual direction to reach the antrum, was found to be very hard, consisting of small cells with thick trabeculæ ; posteriorly the external plate was undermined, a piece of which about 1 *cm* long was removed in one, and there was a cavity reaching so far backward that I suspected the sinus to be denuded, very dark blood flowing from the same. Further proceedings were abandoned, the cavity was well syringed, packed with iodoform gauze, and bandaged.

March 16th.—Removed bandage ; gauze in mastoid left ; no hemorrhage.

March 17th.—Child is up playing ; no fever ; renewed bandage.

March 24th.—Left hospital.

March 27th.—Treated daily at office by syringing with solution carbolic acid and iodoform dressing.

May 8th.—Has been treated at office five times, the wound rapidly filling up from the bottom ; now entirely closed. Dismissed cured.

Case 52.—Chronic Purulent Inflammation of Left Middle Ear; Extensive Caries of Mastoid; Operation; after Seven Months Still Fetid Purulent Discharge from Meatus, and Small Fistulous Opening Remains on Mastoid.

H. L——, male, age five. The child had always enjoyed good health until two months ago, when he had earache and the left ear began to discharge. The mother took him five times to Dr. Hund, who prescribed for him, and last time she saw him he advised her to call on me at the San Francisco Polyclinic. Tuesday, April 1, 1890, the child was brought to me ; he had profuse suppuration from the left ear and the left mastoid region was very much swollen and felt hard, the swelling extending to the mastoid and cervical regions. I sent for my instruments and proceeded at once to etherize the child. Drs. Stroud, Gray, and Redding were present, Dr. Clark assisting. I made an incision parallel to the insertion of the auricle, through the external integuments, which were lardaceous and 2 *cm* thick. Thick pus oozed at once. The infiltration of the soft tissues was so great

that I could not work on the bone, I therefore made a second incision at right angles with the first and running backwards. I was then able to detach the external tissues and expose the bone. The perforations were found in it, one on the external plate close to and at the same height with the external meatus and one on the posterior plate of the external meatus, a narrow bridge of bone separating one from the other. This was first removed with gouge and mallet, the mastoid was then seen to be filled with fungous granulations. With a probe I could penetrate in all directions; I tried to chisel away the external plate, but found it so thin and spongy that the gouge would have no effect. I therefore resorted to Luer's bone forceps, and with it removed the external plate in all directions down to the very apex of the appendix, making an external opening 3½ *cm* wide. The cavity was filled with granulations of livid red color, which were scooped out carefully. When in the depth no place occupied by granulations was scooped without first ascertaining by careful probing that no perforation of the internal plate existed, and that the granulations did not proceed from the dura mater. The large cavity thus obtained was 3½ *cm* long, 3 wide, and 3 deep (like in all cases the bony structure is meant), sloping gradually from the edges. Not the slightest trace of undermined external plate was left in order to allow the external integuments to granulate and extend into the cavity. The hemorrhage was considerable, filling the cavity very rapidly and coagulating in it. After thorough irrigation, the cavity was scooped, all clotted blood removed, and a packing with iodoform gauze applied. Bandage as usual. The child recovered quickly from the narcosis.

April 2d.—Dressing removed in my office. No hemorrhage, gauze in mastoid not disturbed. No discharge from the meatus. Irrigated with carbolized water.

April 4th.—Dressing saturated with secretion, removed gauze in mastoid. The cavity and wound look clean. Filled cavity with iodoform gauze. Dressed the same as usual.

April 5th.—Same as last time. Swelling much less. Surface of cavity and lips of wound covered with a gray exudation. Irrigated with carbolized water. Renewed dressing. Child feels well.

May 3d.—Treatment at first daily, then every second day, now twice a week. Cavity, though still very large, is gradually filling in. When not brought to the office he is treated at home by

the mother, by cleansing with carbolic-acid solution and gauze dressing.

October 20th.—Same treatment about once or twice a week; there is still a small cavity over the mastoid region, with moderate purulent discharge.

[Patient has not returned up to this date (April 14, 1891).

E. S. CLARK, M.D.]

CASE 53.—Acute Purulent Inflammation of Right Middle Ear; Caries of Mastoid; Operation; Death in Two Months from Phthisis Pulmonalis.

E. H——, male, about fourteen years old. First saw patient on March 28, 1890. Had otalgia for three days, followed by otorrhœa of right side for three weeks; was treated by his father (a physician) by syringing with antiseptic solutions, then by a specialist, under whose care he now is.

Status Præsens: Mastoid region somewhat swollen and sensitive to pressure; patient himself looks pale, emaciated, rather tall and slim for his age. Advised continuation of the present treatment, which consists in proper cleansing of ear and local remedies.

March 31st.—Mastoid region very much swollen and sensitive to pressure. Recommended application of ice, and if that was not followed by relief, to have an operation performed.

April 9th.—Saw patient again. He was operated one week ago by having a small incision made 3 *cm* behind insertion of auricle, no escape of pus. Advised further operation to be made to-morrow and arranged for it at County Hospital.

April 10th.—Operation: After cleansing and shaving the mastoid region, washed with sublimate solution 1:1000. Made a linear incision about 5 *cm* in length and 1 *cm* from insertion of auricle. After pushing back the periosteum, used the chisels to a depth of about 5 *mm* in the bone, when pus began to ooze out; the opening was then enlarged with scoops, emptying out considerable purulent matter from a cavity in the bone corresponding to the antrum; this was then scraped to remove rough projections of bone. Syringed with sublimate 1:1000, iodoform dressing, bandage.

April 11th.—Called at office for treatment.

April 13th.—Has been treated daily at office by syringing with carbol. sol., iodoform dressing, wound not granulating well. Patient has considerable fever. Temp., 102° F.

April 14th.—Temp. 104°. Same treatment.

April 15th.—Temp. 101°. Patient's general health very poor; appetite not good; will treat him at home. On examination he is found to have pulmonary tuberculosis.

May 14th.—For the past month have treated the patient at home; the wound has been gradually filling up, but constantly discharging more or less purulent matter. Wound now about 1 by 2 *cm* in size and 1 *cm* deep; will now come to office; he looks very pale and weak.

May 29th.—Patient was treated at office for eight days and then being too weak to leave the house instructed his father to treat him at home. Saw him on the 26th and 29th; the external wound not filling up at all; declining rapidly in general health.

May 31st.—Death from tuberculosis.

Case 54.—Subacute Inflammation of Right Middle Ear with Empyema of Mastoid; Operation; No Communication; Cure in Seven Weeks.

M. P——, male, age about forty. Was seen by me April 14, 1860. Three or four days before Christmas had otalgia l. d. during eight days; applied poultices and then had slight discharge, especially at night; otorrhœa continued one month. Eight days after otorrhœa began, the mastoid began to swell and was very painful. Two months ago applied to Dr. Peroni who opened it.

Status Præsens: Auricle normal; *Mt* thickened, white; mastoid region swollen, red infiltration extending down the neck; 2½ *cm* behind insertion of auricle, a small fistulous opening from which matter can be pressed out. Complains of dizziness in walking. Syringed with carbolic solution, applied bandage and sent patient to German Hospital for operation.

April 15th.—Operation: After thorough cleansing and shaving the mastoid region, made incision as usual about 1 *cm* behind insertion of auricle and 6 *cm* long, when considerable pus at once escaped from the soft tissues, and on pressing along sterno-mastoid more was forced out. A probe was passed in this direction about 4 *cm.* The periosteum was already detached from the bone, and by using the chisel purulent matter was obtained on penetrating the external plate. The chiselling was discontinued and the cavity in the bone scraped with chisels until no processes of bone could be felt. Made small incision in the neck 4 *cm* below

the mastoid, and inserted a rubber drain tube, connecting with the first opening. Syringed with sublimate 1:1000, iodoform dressing.

No communication with external meatus was obtained by syringing.

April 18th.—Has had daily treatment at hospital by syringing with carbolic-acid solution, iodoform dressing. No fever after second day. No discharge from meatus; will come to office for treatment.

May 31st.—Has been treated daily by cleansing with carbolic solution and iodoform dressing. The wound in mastoid gradually filling up, now entirely closed, but fistula in neck still kept open with drain tube; this is now left out, the fistula scraped, and covered with strip of adhesive plaster.

June 4th.—Fistula entirely closed; dismissed cured.

CASE 55.—**Chronic Purulent Inflammation of Left Middle Ear, with Empyema of Mastoid; Operation; Closure of Fistula in Three Months; Still under Treatment for the Otorrhœa.**

D. G. A——, male, age thirty-five, June 17, 1890. Patient sent by Dr. H. Hoffman. Three weeks ago had dizzy spells for two or three days, with fever and vomiting; temperature, 102°. This continued for two weeks. One week ago had sharp pain over left side of face, neck, and shoulder, with swelling at neck, and paralysis of face. Has had otorrhœa on left side for eight years.

Now complains of pain over the entire head, but especially at occipital region.

Status Præsens: Mastoid region slightly swollen; considerable fetid purulent discharge from meatus; after cleansing, *Mt* found entirely gone; tympanic walls thickened, red, and swollen; paralysis of left side of face. Advised immediate operation, and sent patient to German Hospital, where operation was performed.

[*November 3d.*—Patient was treated at hospital on the 19th and 20th of June, when he was sent home, and treatment continued by Dr. Hoffman, who dressed it daily with iodoform after cleansing. On the 5th of July I saw him at his house, and found the wound was closing externally; applied a lead nail to keep it open, but this proved so painful that it was removed and iodoform gauze packed in. On July 16th, he went to the country, and the wound was dressed by his wife daily. September 11th, he re-

turned, and I found still some denuded bone exposed in the fistula. The wound, however, was simply covered with gauze, and on the 16th of September closed entirely. He still has a very fetid purulent discharge from the meatus, the middle ear being filled with granulations. I removed several pieces with snare, then with the probe could feel loose pieces of necrosed bone in the vicinity of the cochlea.

November 26, 1891.—Has been treated once or twice a week, have removed two pieces of bone from the inner ear, and for the last month have applied powdered aristol after cleansing; now very slight discharge, and for the first time since treatment began there is no offensive odor. Will continue treatment.

March 21st, 1892.—Patient was treated irregularly until about January 1st, when the discharge ceased. Have seen him several times since but he has had no trouble whatever with the ear.

E. S. CLARK, M.D.]

[CASE 56.—**Acute Inflammation of Right Middle Ear, with Caries of Mastoid; Operation: Cure in Six Weeks.**

A. B——, male, age forty-one; consultation June 17, 1890. Mastoid region swollen and very painful to touch. Priessnitz bandage applied for two days; no relief obtained; mastoiditis diagnosed, and on the 19th of June operation saw performed at the German Hospital. He was treated there in the usual manner, until the 21st of July, when the wound had almost closed. He was then treated every third day at the office, and on the 2d of August was dismissed cured.

The notes in this case were lost, and I give a mere outline, with length of treatment, to compare with the other cases.

E. S. CLARK, M.D.]

CASE 57.—**Acute Inflammation of Left Middle Ear; Mastoiditis; Operation, with Good Communication, Followed by Facial Erysipelas for Two Months; Cure in Six Months.**

E. H——, male, age thirty-three, consulted me June 19, 1890, with profuse purulent discharge from the left ear. This continued for four days, when the mastoid became swollen and very sensitive to touch. Advised an operation.

[*October 31st.*—Operation was made in usual manner on June 23d. At a depth of about 2 *cm* considerable pus escaped. There

was scooped out some soft decomposed mass of bone and pus, leaving a large irregularly spherical cavity about 1½ *cm* in diameter. By syringing, the fluid passed freely into and through the external meatus; dressed with iodoform gauze and bandage. A few days after the operation the patient was taken with facial erysipelas, lasting for two months; in the meantime the discharge from the meatus gradually decreased, and the wound became pale, no granulations forming. Daily application of gauze, saturated with turpentine and oil; the wound then gradually filled up, and a lead nail was applied 2½ *cm* in length.

The nail was reduced in size until now it is 2 *cm* long by 5 *mm* in diameter at base; the nail fits close in its socket, but at its point is a cavity 3 to 4 *mm* in diameter. Cleansed with a 5 per cent. solution of carbolic acid, and instructed patient how to attend it himself. No discharge from meatus.

December 8th.—Has treated himself as directed. The fistula now corresponds exactly to nail, the small cavity at its point being entirely closed; washed with 5-per-cent. sol. carbolic acid, and left out the nail.

December 10th.—Wound entirely closed; membrana tympani thickened; opaque, no perforation; h = $\frac{0.4}{5}$. Dismissed.

E. S. CLARK, M.D.]

CASE 58.—Acute Purulent Otorrhœa Sinistra; Empyema of Mastoid; Two Operations; Cure in Four Months.

F. S——, male, age fifteen, called at the office July 9, 1890. Two weeks ago went in bathing and the next day had otalgia followed by otorrhœa on left side.

Status Præsens: Very profuse muco-purulent discharge from meatus; considerable swelling over mastoid region and side of neck, some pain on pressure. After syringing an opening is seen in external meatus, through which matter oozed when pressure is made on the mastoid and on the neck along the sterno-mastoid. On probing through this the bone can be felt. Advised immediate operation and sent patient to the German Hospital; was operated on at 3 P. M. by Dr. Morse, Dr. Clark assisting. The external plate was chiselled away and pus appeared. Communication with the external meatus was obtained through the opening above mentioned, and after syringing thoroughly, bandage applied.

July 10th.—Considerable discharge from wound, and on pressing below, following the course of the sterno-cleido-mastoid, a large quantity of matter is forced up. Applied a drain tube 4 *cm* long into this sinus; left the hospital and will call at office for after-treatment by Dr. Clark.

July 11th.—Still considerable discharge, and on probing, rough bone is felt around the walls of the wound: this was removed with curette. Treatment by cleansing with carbolic-acid solution, iodoform dressing.

August 11th.—Has had daily treatment in the same manner; the opening in the external meatus closed, and no communication between this; slight discharge from the middle ear and fistula, but profuse discharge from the wound, especially from the sinus along the sterno-mastoid. Another operation was performed, opening this sinus at its lower extremity and inserting a rubber drain tube. At the same time necrosed bone was removed from the old cavity by scraping, and iodoform dressing applied.

[*October 28th.*—There has been steady gradual improvement; the drain tube was left out after several days, and the sinus closed up.

The fistula slowly healing from the bottom, no nail being required, wound dressed simply with iodoform gauze packed into it after cleansing. Now there is a shallow cavity 1 by 2 *cm* in size filled with healthy granulations. Slight discharge from middle ear.

November 7th.—Has had the same treatment daily. Now the wound is closed and covered with epidermis. No discharge from middle ear. Dismissed. E. S. CLARK, M.D.]

CASE 59.—Acute Inflammation of Left Middle Ear; Empyema of Mastoid; Operation; Cure in Two Months.

A. A ——, male, age thirty. First seen August 12, 1890; for two or three weeks had been suffering with otalgia of left side; *Mt* slightly thickened and opaque; hearing considerably diminished; otherwise nothing abnormal found.

Treated several times with catheter and dismissed. After two weeks he returned, stating that for the past forty-eight hours he had suffered with intense pain in the left ear; had made hot applications and applied leeches, etc., without relief. Now there is severe otalgia, moderate purulent discharge from meatus, mastoid region swollen and very sensitive on pressure. Advised

an immediate operation, and sent patient to the German Hospital for that purpose.

[*October 31st*, 1890.—Was operated in the usual manner on the 26th of August, treated at hospital for several days, then at the office during the month of September. Discharge from meatus stopped several days after the operation. October 1st, the wound presented a healthy appearance, 1 by 2 *cm* in size and 1½ *cm* deep; treated daily with carbolic acid or sublimate solution and iodoform gauze dressing. It granulated nicely and closed October 22d without application of a nail. Now only a linear cicatrix is visible with very slight depression. Hearing h = $\frac{0.3}{5}$. Dismissed cured. E. S. CLARK, M.D.]

CASE 60.—**Chronic Purulent Inflammation of Right Middle Ear with Mastoiditis; Operation; the Wound Allowed to Close after Four Months; No Cessation of the Otorrhœa.**

J. D——, male, age eighteen. Consultation August 16, 1890, presenting the following history: Has had a discharge from both ears since he was a child, sometimes profuse and again very slight; has never had any pain until the last few days. Now complains of otalgia on right side.

Status Præsens: A. D., profuse purulent discharge filling external meatus, very fetid; after cleansing, the membrana tympani not visible, only a thickened ring remaining around its former attachment; malleus entirely gone; fundus filled with granulations; slight pain on pressure over mastoid; no perceptible swelling.

A. S. about same condition as A. D., but no pain on pressure.

Treatment: Syringing with carbolic-acid solution, 1 per cent. Politzer, Priessnitz to right side.

[*October 29th.*—Was treated as before for ten days; the right side gradually growing worse until August 27th, when an operation was performed at the German Hospital by Dr. Ferrer, myself assisting. There was considerable swelling of the mastoid region, the soft tissues being over 1 *cm* thick. No pus was obtained, however, until the bone had been penetrated to a depth of 3 *mm*. There a cavity was reached connecting with the antrum, from which escaped a teaspoonful of sanguineous, purulent, very fetid matter. On syringing, the fluid passed very freely through the meatus, and after scooping out the cavity and removing the sharp edges of bone, it was syringed with sublimate 1 : 1000 and iodo-

form dressing applied. Was treated several days at the hospital, then almost daily at the office until the present time. The wound gradually closed, and a lead nail *2 cm* in length was inserted. At present there is still considerable discharge from the meatus.

Roughened bone can be felt by probing at the bottom of the fistula.

December 1st.—Treatment daily by syringing with carbolic acid or sublimate solution; the fluid sometimes passes from meatus to mastoid, and then again, there is no communication whatever; this is followed by an application of powdered iodoform or boric acid. The nail has twice been shortened; it is now 13 *mm* long; the discharge from the meatus is sometimes very slight and then again profuse, but nearly always very fetid.

December 23d.—There has been no communication of the fistula with the external meatus for two weeks, and one week ago the nail was left out; the wound is now completely closed; no diminution, however, in discharge from the meatus; it still retains its disagreeable odor.

At this date, June 1, 1891, the patient has not been seen since the last entry. E. S. CLARK, M.D.]

TWO NEW AURAL INSTRUMENTS.

By E. B. DENCH, M.D.,

AURAL SURGEON N. Y. EYE AND EAR INFIRMARY.

(*With two drawings.*)

WITH the large number of instruments already at the command of the aural surgeon, one can scarcely understand the necessity of adding to the list. Two instruments, however, devised for my own use, have been of such service that I desire to present them to the profession.

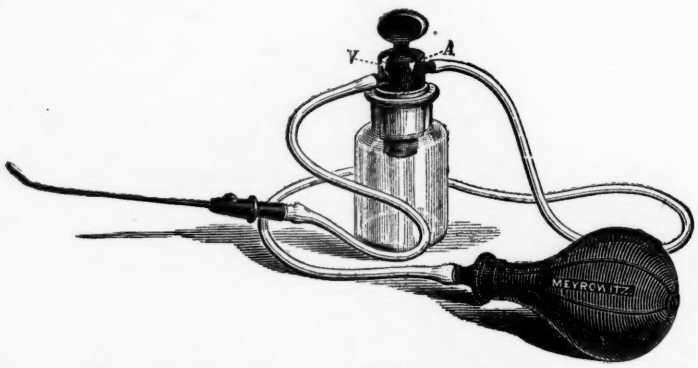

FIG. 1.—Instrument for Inflating the Middle Ear.

The first is an apparatus, by means of which the operator can inflate the cavity of the tympanum with either air or medicated vapor, without removing the inflating bulb from the proximal extremity of the catheter, in making this change in the fluid inflated. The apparatus consists of a small wide-mouthed bottle, in which is placed a sponge saturated with the volatile fluid, the vapor of which we

desire to force into the tympanic cavity. The stopper of the bottle is provided with two short tubes, one on either aspect, which are connected with the inflating bulb on the one hand and the Eustachian catheter on the other, by means of flexible rubber tubes. By means of a small thumb-screw upon the top of the stopper, the core of the latter can be rotated easily, and by simply turning this thumb-screw through an arc of 90° the current of air from the bulb is driven either directly through the rubber tubes into the catheter and thence into the middle ear, or is made to pass down through the bottle before entering the catheter, thus charging it with the vapor contained within the reservoir. A quarter turn of the thumb-screw is all that is necessary to effect the change from air to medicated vapor, or the reverse, the catheter meanwhile remaining undisturbed in position.

The advantage which the device presents, is that it enables us to first clear the tube by means of a current of air, and then, without disturbing the position of the instrument, to make our application to the mucous membrane of the tympanum. If this method be followed, very little of the medicated vapor escapes into the throat, and the attendant discomfort of such applications is correspondingly diminished. The instrument is readily understood from a reference to Fig. 1.

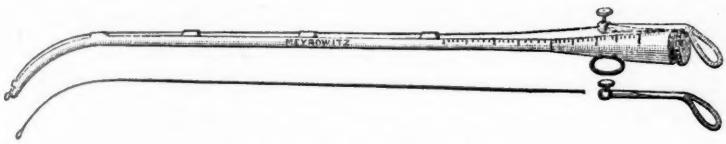

FIG. 2.—Eustachian Bougie.

A second instrument, shown in Fig. 2, which has been of service in many cases, is a metal tongue for the Eustachian tube. For the purpose of dilating the Eustachian tube, I for a considerable time made use of fine whalebone urethral guides for the smaller sizes, and of woven urethral bougies for the larger. It was difficult to find a woven instrument of the sizes from 2–5 F. which was flexible enough to take the curve of the catheter, and yet firm enough to overcome

the resistance of a pathological narrowing in the tube. Another difficulty which was met with, was the fact that in using the dilating instruments of large calibre the catheter had to be increased to such a size that it could not, in many cases, be passed through the nasal chambers without the use of force, and then so completely filled the passages as to interfere seriously with its delicate manipulation. Again, the friction of the bougie in passing along the curved portion of the catheter was so considerable that the operator could not tell whether he was exerting his strength in overcoming an obstruction in the Eustachian canal, or whether the resistance was due entirely to the friction of the bougie within the catheter. To overcome these difficulties, the instrument shown in the cut was devised. It consists of an ordinary pure silver Eustachian catheter of medium size, along the convexity and superior aspect of which are secured several small guides. The tip of the catheter, instead of being cut off at right angles to the bore, is so formed that the section presents the shape of an ellipse.

The superior aspect of the instrument for two inches, beginning at the proximal extremity, is graduated in the fractional parts of an inch.

The bougies are made of german silver, and are bulb-tipped, the shaft being worked down to as small dimensions as are consistent with strength. The shaft is of the same size in every instance, but the tips vary from 2–5 of the French scale. In operating the instrument the shaft is threaded through the guides upon the catheter, and when the bulbous tip is drawn up to the first guide it is found that, owing to the oblique section of the extremity of the catheter, the bulb of the dilator completes the superior wall of the tip of the catheter, thus permitting a current of air to be forced through the instrument and into the Eustachian tube, with the bougie in position. To the proximal extremity of the shaft of the bougie a small handle is fastened, by means of a screw, thus enabling the operator to advance the bougie to any desired extent, the distance being indicated by the passage of the handle over

the graduations already mentioned, marked upon the superior aspect of the catheter. By the small size of the shaft, and the employment of the rings, instead of a tube, as guides, the friction is reduced to a minimum, and the actual resistance caused by the contraction in the canal is easily determined.

Another advantage lies in the fact that the bougie does not occupy the lumen of the catheter, and hence, with the bougie in position, ready for introduction, in case of necessity, we can first inflate, and determine the condition of the tube, and then dilate without removing the catheter. The pervious lumen also enables us to avail ourselves of the use of the auscultation tube in locating the Eustachian orifice, and to then advance the bougie without a change in the position of the instrument.

The use of the metal bougie is not attended with any more pain than is the use of the woven, celluloid, or whalebone instruments, while the chance of the instrument breaking while in the tube is much reduced, and the information imparted to the manipulator, as to the physical conditions, is more accurate. The bougie and catheter being flexible, any curve can be given to the instrument to suit the individual case.

It would seem that the guides might offer an obstacle to the introduction of the catheter, but such does not seem to be the case.

The same instrument may be used to make applications to the Eustachian tube, by substituting for the bulbous bougie a piece of No. 5 piano-wire. This is threaded through the guides in the manner already described, the handle is secured to the proximal extremity, while the distal extremity is roughened, and wound with a small pledget of cotton. This cotton may be saturated with an appropriate solution, and carried to any part of the canal, the exact location being determined by means of the graduations.

Dr. Buck, of this city, was one of the first to suggest applications to the Eustachian tube in this manner, although I think that he confined his applications almost entirely

to the pharyngeal orifice. He also made use of the ordinary catheter, passing the wire, tipped with the pledget, through the lumen of the catheter. It was thus impossible to inflate and make an application without disturbing the catheter to some extent, which difficulty is, I think, entirely obviated in the instrument above described.

In conclusion, I desire to express my thanks to E. B. Meyrowitz for the careful manner in which he has carried out my ideas in the manufacture of these instruments.

SOME SUGGESTIONS CONCERNING THE PROGNOSIS AND TREATMENT OF CHRONIC NON-SUPPURATIVE INFLAMMATION OF THE MIDDLE EAR.

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THE subject of the prognosis and treatment of chronic non-suppurative inflammation of the tympanic cavity is so broad, that it is scarcely necessary to say that it is not the intention of this paper to furnish an outline of the prognosis and a résumé of the treatment of all cases in this category. It is my intention simply to present a few facts which have been impressed upon me in my work, and to add such confirmation as literature may furnish.

The train of symptoms of which these patients complain are either constant, progressive, or characterized by exacerbations, during which periods the symptoms are much more troublesome than during the intervals. For the cause of the constant or progressive symptoms we must look for some long-standing or increasing pathological condition, while the exacerbations are to be explained by influences of an evanescent character. We except here psychical disturbances, as we are dealing only with physical conditions.

The pathological conditions which give rise to the train of symptoms from which these patients suffer may be located in any part of the tympanum. Within the middle ear we may have rigidity or relaxation of the ossicular chain, in either case interfering with the direct transmission of sound waves to the labyrinth. The rigidity may be due to collapse of the membrana tympani from an obstructed Eustachian tube, forcing

the ossicular chain inward, to anchylosis of the ossicles with one another, to fixation of the stapes within the oval window, to adhesions between the ossicles and the walls of the atrium or epitympanic recess, either from a rigidity of the normal folds of mucous membrane, or the development of new connective tissue, to the presence of fluid or inspissated mucus acting as a load, interfering with the vibration of the ossicles; all of these conditions being a sequel of a previous or slowly advancing inflammatory condition. On the other hand, the inflammatory process may have resulted in a relaxation of the delicate structures which bind the ossicles together, or hold them suspended in the tympanic cavity, in which case the transmission of sound waves will be equally faulty, the two larger ossicles acting as an obstruction to the vibration of the stapes. Again, the tympanic membrane itself may be too thick to vibrate properly, or so much relaxed that it cannot transmit vibrations; in either case acting as an obstruction. What the original cause of the condition is cannot be fully discussed in this paper; undoubtedly in many cases the origin is in an inflammation of the mucous membrane of the Eustachian tube, with the attendant collapse of the membrana tympani, and hyperæmia of the tympanum, followed by an exudation of serum, or by an inflammatory process characterized by the production of new connective tissue. The stenosis of the tube may be the result of increased secretion blocking up its lumen with mucus, or it may be the result of swelling of its lining membrane, with paralysis of the muscles. Sooner or later there is developed in many cases a hyperplasia of the walls of the tube, with a permanent narrowing of its calibre. It must not be understood that all cases are due primarily to Eustachian obstruction; I believe that the pathological process may begin in the tympanic cavity and give rise to the formation of extensive adhesions, with very little or no inflammation of the Eustachian tube, as evidenced by its patency upon inflation. Gout and rheumatism undoubtedly exert a causative influence in many such cases. There is also evidence to show that in many instances the affection is of neuropathic origin; the function of the trophic nerves of the tym-

panic cavity being in some way interfered with, there results an impairment of nutrition of the lining membrane of this cavity, in virtue of which the connective-tissue structures lose their elasticity and the ossicular chain becomes rigid. From whatever cause, the final condition is one of impairment of the normal resiliency of the conducting mechanism.

The causes of the exacerbations are most frequently exposure to cold, or are due to indiscretion in habits of life, in either case resulting in a swelling of and increased secretion from the mucous membrane of the Eustachian tube, narrowing its calibre, and by collapse of the tympanic membrane hampering the vibrations of the ossicles. Our prognosis in any given case, then, will be first with reference to the exacerbations, and second with reference to our ability to overcome such permanent conditions as already exist, and prevent their further progress.

No one will question, I think, our ability to prevent the exacerbations. As the result of exposure to cold, there is set up an acute catarrhal inflammation of the mucous membrane of the nose or naso-pharynx, which parts in many cases are already in a state of chronic inflammation. It is here that the greatest benefit is derived from the treatment of the nose and naso-pharynx. Obstructive lesions in both localities should be removed and the inflammatory conditions controlled. In this manner, with due attention to hygienic measures, the liability to recurrent colds is broken up, and the frequent attacks, which not only increase the severity of the chronic symptoms, but to a marked degree induce permanent pathological changes, cease. As remarked above, these exacerbations are attended with swelling and alteration of secretion in the mucous membrane of the Eustachian tube. My experience has been that changes dependent upon a morbid condition of the nose and naso-pharynx, and benefited by treatment of these parts, are almost without exception evidenced by the presence of mucus in the Eustachian tube, partially or completely occluding it. When the process has gone on to hypertrophic changes in the walls of the tube, thus permanently narrowing its calibre, other measures are necessary; these will be discussed when

we come to speak of treatment. So much, then, for the exacerbations, which we can certainly relieve.

Next, what signs furnish us with an index of the amount of improvement which we can bring about in the tympanic cavity? The examination with a series of tuning-forks has afforded me a method upon which I rely more and more. For this purpose I use a series of five forks, as advised by Hartmann,[1] the lowest registering 128 vibrations per second, the highest 2,048, each fork differing from the one immediately below and above it by one octave. Ordinarily the tuning-fork is used to determine by means of the well-known test of Rinne whether we have to do with any lesion of the internal ear. The degree of impairment of hearing necessary for the test to be depended upon has been determined by Lucae[2] to be that in which the whispering voice is not heard at a greater distance than one metre, or about forty inches; an absolute diminution in bone-conduction when this degree of impairment has not been reached also usually denotes the same condition. In testing with the series of forks, as above described, a lesion of the receptive apparatus is usually evidenced by total deafness to certain notes, both by air- and bone-conduction. While this test enables us to determine the involvement of the receptive apparatus, a comparison of the relative duration of air- and bone-conduction, as tested by the above series of tuning-forks, offers, I believe, a valuable basis upon which to form an opinion as to the probable result of treatment.

In testing a large number of cases of chronic non-suppurative inflammation of the middle ear, one will become impressed with the fact that the reversal of the normal relation between air- and bone-conduction begins with the lowest notes of the scale, and as the disease advances gradually ascends the scale, until finally the higher notes are heard equally as well, or even better, by bone- than by air-conduction. In other words, the weighting of the conducting apparatus by anomalies in tension interferes first with the transmission of the low notes, and as the pathological condition

[1] *Die Krankheit. des Ohres*, Berlin, 1889, p. 32.

[2] Cited by Bezold, *Allg. Wien. med. Zeit.*, 1887, p. 183.

increases, the transmission of the higher notes is also interfered with. Out of thirty-eight cases in which these tests have been made, and the cases followed, in twenty-seven, preponderance of bone-conduction over air-conduction existed for from one to four octaves, and in twenty-five of these cases treatment was followed by decided improvement. When the rigidity is so great that the fork C^4 is heard better through the bone than through the air, this test in my cases has denoted such a degree of rigidity that treatment has failed to overcome it; in other words, the fork of 1,024 vibrations per second seems to furnish a somewhat constant limit as to the amount of rigidity which we are able to overcome by treatment. This was well illustrated in a case in which upon one side the preponderance of bone-conduction over air-conduction existed for the first four octaves, while upon the other side the entire series of forks was heard better through the bone than through the air. This latter ear failed to respond to treatment, while the other improved. The rule is of course not absolute, but with proper care in applying the test, repeating it several times, if in doubt as to the correctness of the patient's answers, and taking into account also the degree of impairment to whispered speech, we shall be able to draw valuable inferences from the examination. The degree of obstruction of the Eustachian tubes should also be taken into account in applying the test, and if this is found to be great, the trial with the forks should be repeated a few moments after inflation, if it is desired to gain accurate information as to the amount of structural impairment in the sound-conducting apparatus.

Most of the cases reported above were of the dry variety, the sclerosis of the German writers. While I do not hold the sign as invariable, I do believe that it possesses a considerable amount of importance. The length of time the disease has existed, the age of the patient, the general condition, etc., are all factors in prognosis, which are so well known that mention need scarcely be made of them here. The length of time which the symptoms have persisted may aid us materially in our prognosis, in connection with the above tests. We have seen that the principle involved is

merely a mechanical one, being a loading down of the transmitting mechanism; it follows, then, that if the tests with the tuning-forks show a marked interference with this mechanism, our chances of overcoming it will be much better, if the disease has existed but a short time, than if it has been of long duration. As illustrating this, a case presented at my clinic some time since with a history of impaired hearing in one ear for several years, while in the other defective audition was of short duration. The tuning-fork reactions were the same upon both sides, bone-conduction being greater than air-conduction for the first four forks. By inflation, however, the hearing upon the side recently affected became immediately normal, while upon the other, where the affection had existed for a long time, only slight improvement followed the single treatment. In this instance the load upon the transmitting mechanism was the depressed membrana. Age may confuse us in our prognosis based upon a tuning-fork record, unless we remember the affection which Roosa[1] has so aptly described as presbykousis. This is a condition met with in people beyond middle life, in which the functional activity of the auditory nerve is to an extent impaired, particularly in reference to the preception of sound by bone-conduction; hence in an individual past middle life in whom the hearing is considerably impaired, and in whom the bone-conduction is not in excess of air-conduction, our prognosis should not be as unfavorable as in the same condition in a younger person, since these signs do not at this age positively exclude disease of the middle ear, and treatment applied in this direction may be beneficial, especially if there is any evidence of a catarrhal condition of the upper air tract. This deceptive effect of age is well illustrated in several of my own cases, in which the first glance at the fork reactions seemed to indicate a lesion of the receptive apparatus, and yet treatment directed to the middle ear was followed by improvement. In one case, that of a man aged sixty-two, the reaction to the tuning-forks, in connection with the impairment to whispered speech, seemed to point to a lesion of the receptive appara-

[1] *Trans. Amer. Otological Society*, 1885.

tus, although the clinical history of such an affection was wanting. Treatment directed to the middle ear restored almost normal hearing.

With reference to secondary involvement of the internal ear, we must rely mostly upon complete failure to perceive certain notes of the scale, and also upon an absolute shortening of bone-conduction. Any such involvement of necessity renders the prognosis much more grave.

As regards treatment, we must have a clear idea of the pathological conditions in each given case. We have seen that the obstruction may be in the membrana tympani, tympanic cavity, or Eustachian tube, and we must in each instance remove such obstruction as far as possible before pronouncing the condition beyond hope of relief. Of internal medication little can be said, other than what would suggest itself to every physician. The diathetic conditions of gout and rheumatism undoubtedly, in certain cases, exercise a causative effect upon chronic inflammatory conditions within the tympanum, and medication in this direction may frequently be of service. The one drug which has been of service when these diathetic conditions were wanting has, in my experience, been pilocarpin, as suggested by Kosegarten.[1] We should certainly use this drug if there is the least evidence of involvement of the receptive apparatus, and it has proved efficacious in some of my own cases even where there were no evidences of labyrinthine invasion. With reference to the Eustachian tube, recurrent attacks of inflammation in this location are of great damage in these cases, and especially in childhood and youth, constituting the most frequent cause of the tympanic affection, the history being marked by repeated attacks of impaired hearing, following upon colds in the head, each one leaving the patient a little worse than before the attack. For the purpose of combating such attacks, treatment directed to the nose, naso-pharynx, and oro-pharynx is of prime importance. Obstructive lesions, such as enlarged pharyngeal or faucial tonsils, deformities of the septum, and hypertrophic rhinitis, should be dealt with radically, and the upper air passages put

[1] Arch. of Otology, vol. xvii., p. 95.

in a perfectly healthy condition. In this way farther progress is stopped, and in the cases seen early in life, frequently retrograde changes take place, as the result of the restoration of the normal circulation to the tympanic cavity and Eustachian tube, ending in a complete cure. In older cases treatment of the upper air tract prevents the recurrent exacerbations.

If the obstruction in the tube is caused simply by swelling or secretion, inflation by means of the catheter will overcome this. The inflation may be accomplished with air simply, or with medicated vapor from one of the volatile substances—such as menthol, iodine, camphor, benzoin, etc., the intention being to restore the mucous membrane to the condition of health. Applications of astringent solutions to the mouth of the tube, by means of a curved applicator passed through the anterior nares, may be beneficial. In some instances when these have failed, I have obtained excellent results by making the application to the entire length of the tube by means of a pledget of cotton twisted about a piece of fine wire, which being saturated with the solution is inserted in the same manner as a bougie. This will sometimes prevent the accumulation of thick secretion in the tube when all other means fail. If the walls of the tube have become permanently thickened, the procedure which in my hands has yielded the most satisfactory results is the use of Eustachian bougies. Any permanent narrowing of the tube is especially troublesome in instances where the intratympanic structures and membrana tympani are relaxed, as a very small amount of secretion will completely close such a tube, resulting in the collapse of the membrana and ossicles, with consequent impairment of the transmission of sound waves. Bougieing in these cases has been attended by excellent results, even when the obstruction had existed for years. Personally I prefer the metal bougies which I have devised for this purpose, but others no doubt accomplish the end equally as well. In connection with the dilatation, massage of the tube may be practised, after the manner advised by Urbantschitsch.[1]

[1] *Arch. für Ohrenheilk.*, vol. xxii., p. 118.

With a constantly patent tube our efforts must next be directed to the tympanic cavity. Here observation has taught me that many cases only improve after a long course of treatment. Inflation, practised two or three times weekly, and later at longer intervals, in a large number of cases will yield good results, even though there may be no improvement in the first few weeks or even months. From the nature of the process time is a great element, and we can scarcely hope in a few weeks to effect an absorption or relaxation of adhesions which have taken years to form.

In a number of cases in which local treatment has been followed faithfully for many months the most gratifying results have been obtained, where if the treatment had been discontinued at the end of a few weeks no improvement could have been recorded. To fully test the value of such treatment it must be kept up for a long period, unless it causes an aggravation of the condition, when of course it should be discontinued at once. The beneficial effect of inflation seems to be largely mechanical, by stretching the adhesions, and in some cases causing an absorption. Menthol, camphor, or iodine vapor may be used in inflating, as already described. These substances undoubtedly exert a stimulating effect upon the tympanic mucous membrane and favor resorption. They certainly relieve tinnitus in a certain proportion of cases in which simple inflation is without effect. As the beneficial result of inflation depends more upon mechanical action than upon the ventilation of the tympanic cavity, it is often well to compress the bulb with considerable force and to continue the inflation for some time ; the exact amount of force must vary with each case, according to the amount of resistance to be overcome. Passive motion by means of Delstanche's masseur, or kindred instruments, has not in my hands proven as beneficial as inflation. In conjunction with inflation, systematic exercise of the organ by means of a conversation tube or otophone is of unquestionable benefit, acting in much the same way as passive motion to a stiff joint. The method of carrying this out is to direct the patient not to use the instrument regularly for the purpose of hearing ordinary

conversation, but to allow an attendant to read to him through the instrument for a short period once or twice daily, repeating such words as are not understood, from ten to fifteen times. In this way the structures within the middle ear are exercised in a perfectly natural manner. Another benefit which is derived from this method, is that it teaches these patients, to a certain extent, a new language, since the diseased conducting apparatus may never transmit sounds exactly, and by practice they learn to interpret correctly the modified sounds which are heard. In two of my own cases such a plan has been of great benefit. The idea is not a new one, and was suggested long ago by Toynbee.[1]

If the above efforts fail to afford relief, our next resort should be to surgical procedure. The first step should be an exploratory myringotomy, in that the incision will afford exit to the fluid if any be present within the tympanum, and will enable us to wash out the cavity, either through the Eustachian tube or meatus, in case inspissated secretion is found. It will also enable us to test the mobility of the stapes, as suggested by Schwartze,[2] the knowledge of which condition is of the first importance in determining subsequent procedure. Through the incision we may also divide any adhesions which may exist in the cavity, and when indicated to perform tenotomy of the tensor tympani or the stapedius muscles, and also sever such adhesions as may exist in the epitympanic space. If the hearing is improved by the myringotomy, but falls when the wound closes, our efforts will be directed towards maintaining a permanent opening. Repeated perforation with sulphuric acid can be performed, as the operation is not attended with much pain, and very little reaction follows. If the simple myringotomy does not improve the hearing, or if repeated perforation seems undesirable, there is no question in my mind as to the advisability of removing the membrana, malleus, and incus, in that it affords a perfect drainage of the epitympanic space, and almost certainly prevents any serious inflammatory reaction following our operative procedures. The

[1] "Diseases of the Ear," American edition, Philadelphia, 1865, p. 433.

[2] *Arch. für Ohrenheilk.*, vol. v., p. 270.

membrane may form again, but its destruction or removal becomes a much more simple matter with the two larger ossicles out of the way, and the epitympanic recess freed from connective tissue, than when this space, with its numerous bands, offers opportunity for foci of suppuration. With a movable stapes, it is my impression that we should excise as little of the membrana as possible in removing the two larger ossicles, and should so make our incisions as to favor an adhesion between the head of the stapes and the membrana, using this latter as a means of transmitting the vibrations of a larger column of air to the stapes. The membrane here acts in the same manner as the cotton pledget, placed over the head of the ossicle in purulent cases, which so often improves the hearing. Extraction of the malleus and incus can be easily effected through a comparatively small opening, but to cause the adhesion between the membrana and the stapes is a much more difficult matter, and in the case where I performed the operation I am not certain that this was accomplished, although the result was very satisfactory. When the motions of the stapes are not found to be free, the tissues about its base should be divided, as advised by Kessel,[1] and if this does not accomplish the desired end we may attempt to mobilize the ossicle, as advised by Boucheron,[2] Miot,[3] and others. If this is to be done, however, I believe that the membrana, malleus, and incus should be removed, both to guard against any inflammatory action and to permit of access to the parts in case a secondary mobilization becomes necessary. Miot has reported good results from this operation in non-suppurative cases, as well as in old purulent ones. In instances belonging to the latter class, I have already testified to its merits.[4] Attention must also be given to the condition of the mucous membrane in the neighborhood of the round window, in that thickening in this location may hamper the vibration of the perilymph, even if the stapes itself is not firmly fixed.

[1] *Arch. für Ohrenheilk.*, vol. xi., p. 212.
[2] *Bull. Méd. de Paris*, 1888, p. 553.
[3] *Revue de Laryngol.*, vol. xi., 1889, p. 49.
[4] ARCHIVES OF OTOLOGY, vol. xx., p. 13.

Multiple incision of such tissue will propably be the most satisfactory way of dealing with it.

The question of removal of the stapes is, I suppose, at present not to be thought of, yet when we consider the instances in which its removal has been accidentally accomplished, with no bad results, and also the experiments of Botey[1] and Kessel[2] upon animals, I do not think that we are entering an entirely speculative field, when we hope that further investigation in this direction may enable us to turn these researches to some practical end. We can never promise in a given case what the amount of improvement will be from operative procedure, but we can promise that the condition will not be aggravated, and that the chances of improvement are certainly fair. The one point which I would urge is a thorough study of each case, and a prolonged trial of the milder methods of treatment; testing the hearing at frequent intervals in order to accurately note the progress. Surgical measures should certainly not be advocated until other measures have had a thorough and prolonged trial and have failed; but when they have failed we should not delay our operative interference. Cholewa[3] states that operative measures are not likely to be followed by good results if the bone-conduction for the forks C and C[1] is of less than eight seconds' duration, while the aërial conduction for the first five octaves should not fall below one fourth the normal duration. He, however, remarks that even in these cases we may improve the hearing, but with such a high degree of impairment a guarded prognosis should be given. There is one very interesting point in connection with the operative procedures to which attention has been called by Cholewa and others, and that is the fact that surgical interference upon one ear frequently benefits the ear of the opposite side. In one of my own cases an excision of the ossicles of the left ear more than doubled the hearing distance upon the opposite side and arrested the tinnitus, while in the ear operated upon the hearing distance was

[1] *Amer. Jour. of Med. Sciences*, vol. ci., p. 632.
[2] *Loc. cit.*, p. 207.
[3] ARCH. OF OTOLOGY, vol. xix., p. 151.

slightly increased, and the tinnitus very much reduced. Such improvement can be explained by accepting the investigations of Baginsky,[1] Edinger,[2] and others, which demonstrate a crossing of the acoustic vibrations in the medulla. The above clinical facts suggest that with both ears affected, our operative procedure should be directed toward the poorer ear, while with a single ear affected and a family history of impaired hearing, especially if there is the least evidence of involvement of the opposite side, early operation should be advised upon the poorer ear, both for the purpose of benefiting it, and for preventing the progress of the affection in its fellow.

In conclusion I would say that I trust my readers will not consider that the preparation of this paper has consisted in a collation from literature of every conceivable form of treatment of the disease under consideration. With scarcely an exception, I have made a thorough trial of all the means suggested here, and my opinions are based on the results obtained. With reference to surgical interference I can truly say that in no case have I ever seen a bad result follow any of the operations, either immediately or subsequently, and in nearly all there has been a certain amount of improvement, either in diminishing the tinnitus or improving the hearing.

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[1] *Arch. für Ohrenheilk.*, vol. xxiv., p. 54.
[2] *Anat. Anzeig.*, 1887, Nos. 6 and 8.

MECHANICAL TREATMENT OF TENSION ANOMALIES.

By CLARENCE J. BLAKE, M.D., Boston, Mass.

THE delicacy of the sound-transmitting apparatus of the human ear, and the microscopic minuteness of its adjustment in responsive vibration to a wide range of musical tones, are in themselves suggestive of the effects which may accrue from even slight derangement of the comparative adjustment of its component parts.

That the effects of such derangements are not more frequently brought to our notice is due principally, probably, to the two facts, that there is in nature a considerable margin of compensation, and that the minor effects are likely to be noticed only by trained observers.

Among these trained observers we should expect to find musicians in the first rank, and it is among people of this profession, therefore, that the most interesting cases of the effects of minute changes in the sound-transmitting apparatus upon the hearing for musical tones, either of some instrument or of the individual voice, occur.

The first of the cases here submitted is that of a musician whose hearing in the right ear responded to all normal tests, the ear itself presenting a normal appearance.

In the left ear he had previously had a suppurative process in the upper portion of the tympanic cavity, with perforation of the membrane of Shrapnell, the lower portion of the membrana tympani remaining intact with but slight thickening of its mucous coat, and the ear responding to hearing tests at the average of very nearly two thirds of the normal hearing.

The patient was an expert violinist, and as the suppurative process had occurred in childhood recalled no special instances of inconvenience from impairment of hearing in the left ear.

During the winter previous to his first visit, however, he had had a series of head-colds accompanied by a sense of fulness in the left ear, which had led him to practise Valsalvian inflation frequently for the sake of the relief it afforded.

Three days before his visit he had noticed while practising on the violin that when the head was bent forward and to the left, as is often the custom in the rendering of more delicate passages, the tones of the violin sounded dull in the left ear, and there was a definite loss of timbre perception.

When the head was raised this disability disappeared, to immediately recur on the lowering of the head to the position mentioned.

Examination of the left ear showed the external auditory canal free, the membrana tympani intact, as has been mentioned, and a small round dry perforation of the membrane of Shrapnell.

Tests with tuning-forks and with high musical tones corroborated the testimony given by the patient in regard to the effect of the change in the position of the head on the hearing for qualitative overtones in the left ear.

Valsalvian inflation exhibited a considerable movement of the membrana tympani outward, and evidenced a relaxation of the tensor tympani, malleo-incudal capsular ligament, and the corresponding attachments, such as would favor a separation of the malleo-incudal articulation within such limits as would permit the passage of the larger sound-waves of the medium and lower tones but would result in the loss in transit through the articulation of the motion incident to the shorter sound-waves of the qualitative overtones.

Inflation of the middle ear, extension of the membrana tympani outward, and corresponding tension of the capsular ligament, and increased contact pressure of the articulating surfaces restored in a measure the ability of the parts to transmit the short sound-waves, and still further increased the hearing for the qualitative overtones, which had been found, it should have been said, to be somewhat imperfect even with the head of the patient erect.

It was evident, therefore, that any mechanical arrangement which would bring about a more natural adjustment of the malleo-incudal articulating surfaces, and would maintain them in that

position long enough to allow the relaxed tissues to normally contract, would not only relieve the patient of his recent embarrassment but would probably have more permanent beneficial effects.

The requisite pressure on the short process of the malleus was effected by means of a strip of thin, elastic rubber tissue three *mm* in width and twelve in length, which being seized at the two ends with the angular forceps was carried into the ear under good illumination, with the convex portion of the resultant ellipse in contact with the short process, when the two ends being released from the grasp of the forceps and allowed to spring outward against the walls of the canal, a pressure which was subsequently estimated by experiment to be equal to the support of fifteen milligrammes was exerted upon the short process.

With this support to the relaxed parts it was found that the head could be placed in any position without impairment in hearing for over-tones and the patient was enabled to resume his professional work undisturbed.

The improvement thus effected lasted for very nearly a week, at the end of which time it was found that the rubber, more strongly adherent to the skin at its ends than at its convexity, had moved outward with the progressive growth of the dermoid lining of the canal, so that pressure was no longer exerted on the malleus.

As the result of this experience and also of the fact that in making the first application the freshly cut ends of the rubber were found to adhere under the pressure of the forceps, thus preventing the springing apart of the ends when released, two changes were made in the method of application.

The two ends of the rubber strip were cut, one at an angle, and the other on a curve, the curved end being placed toward the posterior wall of the canal and the convex surface of the rubber strip ; that portion which was to be brought into contact with the malleus was lightly smeared with vaseline before introduction.

Under these conditions not only did the rubber adjust itself better to the contour of the canal, but the application of the vaseline afforded a twofold advantage, since it made it possible to distinguish readily between the two surfaces of the rubber strip, the one being smooth and shiny and the other retaining its original dull appearance ; since the vaseline side also was the one brought into contact with the skin the slipperiness of the surface permitted its much more complete adjustment by gentle pressure of the

probe or with the closed forceps, and a further advantage was found to accrue, in that the absorption of the vaseline producing a partial vacuum beneath the rubber resulted in so close an adherence of the latter to the skin, that the beneficial effects of the spring were of much longer duration, and in some subsequent instances it was found on the removal of the rubber that a thin layer of exfoliated epidermis was adherent to it.

In the case in question after three or four applications of the rubber spring, extending over a period of about six weeks, the improvement in hearing remained without the application, which was repeated, however, once again during the subsequent year.

A consideration of the angle at which the plane of surface of the membrana tympani is set to the long axis of the external canal, and of the adjustment of the rubber strip, one end of which rests upon the anterior wall of the canal directly opposite the presenting surface of the short process of the malleus, shows that the pressure exerted by an elastic substance thus placed, would be directly in the line which would favor the most complete apposition of the malleo-incudal articulating surfaces with reference to the transmission of mechanical movement from the first to the second bone, and would, moreover, by counterfeiting in a measure from without the effect of muscular traction from within, favor that action of counterbalance in the preponderating weight of the ossicula above the axial line of vibration which is most favorable to the transmission of short sound-waves falling upon the membrana tympani below.[1]

Of the various effects of abnormalities of tension of the sound-transmitting apparatus, those which show themselves by changes in the voice of the patient are often most instructive, and when these occur in the singing voice the

[1] The above observations are in accordance with the theory of Knapp, concerning the mode of action of the artificial membrana tympani, communicated verbally to Politzer and mentioned by him in his text-book on diseases of the ear.

Politzer himself found that the cases where the artificial membrane effected an improvement in hearing moderate pressure with a blunt probe on the short process had the same effect, while in other cases it was necessary to make the pressure lower down upon the handle of the malleus.

subject becomes one of very great importance to the individual and worthy of painstaking search as to a possible remedy.

Since the modulation of the voice is governed more or less by our sense of hearing, and since the tympanic cavity and membrana tympani represent a certain individual pitch in vibration, and since this particular tone lies always rather within the limits of the upper than of the middle or lower register of the singing voice, it stands to reason and may even be stated as a recognized fact, that the production of tones in the upper register of any singing voice is especially affected by the tension of the transmitting portion of the auditory apparatus.

Changes in the tension of this apparatus might therefore be expected to act reflexly as it were upon the production of the voice tone, an effect which could be more or less compensated for by changes of method in production, involving a certain degree of effort; it would be expected also that the change most likely to have a disastrous effect upon the appreciation of, and therefore the production of the qualitative over-tones would be a decrease in tension, on relaxation, of the whole or a part of the sound-transmitting apparatus. And this has been shown to be the case in instances where relaxation of the membrana tympani, more especially of its posterior segment, has been accompanied by an unfortunate tendency to flat in those notes the qualitative over-tones of which might be supposed to correspond to the individual tone of the membrana tympani. Of this the following case is an illustration:

Mrs. X., soprano, who had sung successfully in public for several years, suddenly found herself flatting on F and F♯ in her upper register. This tendency to flat continued despite vocal efforts to correct it, but was temporarily relieved by Valsalvian inflation, the duration of the improvement so effected becoming gradually shorter and shorter, until it was no longer of value for more than a few minutes at a time.

Examination showed a slight naso-pharyngeal catarrh, some swelling of the tubal mucous membrane, and both membranæ tympani, especially the right, moving freely on Valsalvian infla-

tion, and showing, moreover, some stretching of the posterior segments of the membranes.

The hearing was rather more impaired in proportion for high, than for low tones, and there was slight circulatory tinnitus in both ears. Valsalvian inflation increased the hearing for high tones and proportionately decreased the tinnitus. In running the scale with the voice there was a perceptible flatting at F F♯ the tone being given without clearness and brilliancy.[1]

Application of the rubber strip in the same manner as described in the previous case, gave immediate and interesting results. The tinnitus aurium decreased, the hearing for low tones remained about the same, and was only slightly improved for high tones, but the voice was decidedly and beneficially affected, so that the patient was able to sing in public on the following day.

In this case, the repeated closure of the Eustachian tubes consequent upon the continued post-nasal catarrh with the corresponding rarefaction of air in the middle ear alternating with condensation incident to the Valsalvian inflation, had produced a stretching not only of the membrana tympani and the muscle, but also of the malleo-incudal capsular ligament and the conjoint attachments.

The rubber spring pressing as in the former case served to restore the apposition of the malleo-incudal articulating surfaces, and to support in a measure also the relaxed membrane; it remained in place satisfactorily for a period of ten days and was then renewed with equally good results.

A third application, however, was not so efficacious, and it was therefore inferred that the rubber having effected its purpose, the remaining disability was due rather to the relaxed condition of the membrana tympani in its posterior portion, and the treatment was continued by the application of paper disks to this surface. The paper dressing was also found to serve the practical purpose of restoring the quali-

[1] The point of transition from the medium (or mouth vibration) to the head tones seemed to be the first affected, the tones F F♯ being flat, and all tones above still more so, until at the end of a scale the voice was invariably half a tone flat, while to compensate for this it was necessary to resort to a forced effort in producing the tones, which over-exertion had finally produced its inevitable result of voice strain.

tative value of the voice, this improvement lasting from periods of from three to ten weeks, a repetition of the rubber application not having been required.

In this case, a more frequent or a continuous use of the paper, following upon the rubber application, would probably have had a more permanent result.

The effect of relaxation of the sound-transmitting apparatus upon the transmission of sound from within outward is further illustrated by those cases of circulatory tinnitus in which the subjective noise becomes sometimes so annoying as to prove of greater detriment to the patient than the corresponding loss of hearing for sounds from without.

The following case may be given as an instance of this kind.

A gentleman, thirty-six years of age, of intellectual pursuits, and a public speaker, began, two years before his first visit, to have circulatory tinnitus in the left ear; this had gradually increased, both in volume and in variety, until to the simple continuous high-pitched sound there was added the deeper tone and the pulsation of the larger vessels.

The resultant compound noise had become so troublesome as to seriously interfere with his ordinary mental work, and the occasional relief afforded by forcible Valsalvian inflation was becoming less and less to be depended upon.

An examination of the left ear showed a considerable thickening of the tympanic coat of the membrana tympani, and inflation of the middle ear gave a very decided excursion both of the malleus and membrane, while the maintenance of the pressure in the middle ear decreased the tinnitus aurium.

This favorable effect was also brought about by the application of the rubber strip, and continued several weeks, at the end of which time reapplication was necessary.

This favorable effect was also brought about by the application of the rubber strip, and continued several weeks, at the end of which time reapplication was necessary.

It should be especially noted, in dealing with cases of which the foregoing are examples, that the treatment consisting merely in the application of well-recognized surgical rules modified to meet the peculiar contingencies presented

should be apportioned to the delicacy of the apparatus with which it has to deal; and furthermore, that while the immediate result may be eminently satisfactory, the treatment must be long-continued to get any permanent result in a condition which has become essentially chronic by the time it is brought to the attention of the surgeon.

Still further, it should be said, that the adjustment of such mechanical appliances must always be a matter of more or less experiment, since the questions of the weight and position of, and the degree of pressure exercised by, the dressing are variable factors which must be apportioned to the individual needs of the case under consideration.

The fact therefore that the application does not give immediate relief by no means justifies the conclusion that it cannot be of service, since the effect may either follow later or may be more immediately brought about by slight change in adjustment.

A CASE OF PRIMARY LABYRINTH NECROSIS WITH FACIAL PARALYSIS.

By MAX TOEPLITZ, New York.

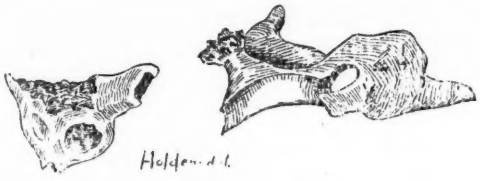
(*With two drawings.*)

M. K., aged six and a half years, was seized toward the middle of April, 1889, with a severe attack of scarlatina associated with an exanthema of a week's duration and slight throat affection. On May 6th the mother noticed that the face was drawn to the right side, especially in laughing, and that the child could not close the left eye. A few days later her attention was drawn to a profuse purulent discharge from the left ear. For five weeks the girl was confined to bed, and she could not stand on her feet after the termination of the disease. She had to learn walking anew, which took her over three weeks. In the beginning she was in danger to fall at the slightest movement. On June 17, 1889, nine weeks after the first appearance of the affection, the patient presented herself at the N. Y. Ophthalmic and Aural Institute, and the attending aurist (Dr. McMahon) diagnosed left facial paralysis, aural polypi (?), caries of promontory (?), and removed several polypi on the same day. Later on he has repeatedly removed polypi with the sharp spoon, during which operations several small, shapeless particles of bone were discharged. Profuse otorrhœa persisted and polypoid granulations formed continually. Since the beginning of the affection the patient had not complained of pain or tinnitus.

On January 29, 1891, the patient came under my observation in my service at the N. Y. Ophthalmic and Aural Institute. The facial paralysis could not be noticed when the facial muscles were at rest; in laughing, however, the face was drawn to the right.

I found the left external meatus to be filled with polypi and removed several, on the day of the patient's first presentation, with the cold snare. On February 26th and on April 3d some more polypi were removed. The granulations reappeared abundantly in spite of the use of the sharp spoon and chromic acid. In the beginning of June on probing I noticed a firm resistance in the external auditory meatus, which gave the impression of rough bone. An attempt at removal with the sharp spoon failed on account of intense pain and of the sequestrum being firmly wedged in the osseous meatus.

On July 9th the sequestrum (cp. Fig. 1) had loosened itself so as to permit its removal with the cold snare, whereby intense pain was caused through its sharp edges. Two days previous to the removal the patient complained for the first time of continuous pain, which lasted until after



x2.

FIG. 2. FIG. 1.

the removal of the sequestrum. Otorrhœa still continued and polypi occurred, although sparsely.

On August 6, 1891, another resistance was discovered in the external meatus and immediately removed with the spoon in narcosis (cp. Fig. 2).

Since August 7, 1891, the otorrhœa and polypi had permanently disappeared. The two sequestra belong to the petrous portion of the temporal bone—viz., both are portions of the cochlea.

The sequestrum, which was first removed (Fig. 1), is about $\frac{9}{16}''$ long, and $\frac{1}{4}''$ wide; it is perforated by a wellnigh round opening, from which a curved sulcus emanates, the curvature corresponding to one fourth of a circle.

The second, smaller sequestrum, is $\frac{5}{16}''$ long and $\frac{1}{4}''$ wide, with two openings which end in two curved tubes running toward each other.

The two sequestra can be exactly attached to each other at the eroded places.

The electric examination kindly made by Dr. Barney Sachs at my request on December 31, 1891, had the following result:

There exist but the remnants of a paralysis of all branches of the left facial nerve. The angle of the mouth is drawn only in exertions and in laughing. No deviation of the uvula. The electric reactions have also become nearly normal. The nerve is excitable by strong faradic currents, but, of course, not by far to such an extent as the healthy facial.

The left facial responds to very strong galvanic irritation (first Kath. Clos. at 6 M. A.), whilst the muscles react to less strong currents (orbicularis oris, first K. C. at 6 M. A., first A. C. at 8 M. A. On the right side the first K. C. can be reached at 3.5 M. A.). Hence follows that there exists but a slight indication of the former disturbance of electric reaction. No degenerative reaction was present on the day of examination. Complete recovery is to be expected within a brief period."

The patient states at the *examination of hearing* that she hears on the left ear the high and low tuning-fork through air-conduction as well as through bone-conduction; on the other hand, she hears also the tuning-fork, placed upon the *right mastoid process*, in the *left* ear only, even when the right ear is closed. It can, however, hardly be supposed that she still perceives with the left ear, since exact localization must be excluded in the very young patient, and the statement of perception in the left ear of the tuning-fork, when placed upon the normal ear, contradicts all physiological laws.

The voice is heard only when spoken very loud into the affected ear, and here also the perception of the right, though closed, ear cannot be excluded.

Otoscopy of the left ear reveals that the tympanic cavity is covered with a delicate scar, which must be considered as pseudo-membrana tympani.

The literature on labyrinthine necrosis has been collated by Bezold up to the year 1886 in vol. xvi. of these

ARCHIVES. Since then about twenty cases have been published, a synopsis of which I shall publish in the next number of these ARCHIVES.

In the greater number of observations the necrosing process develops but secondarily in the course of suppuration of the middle ear.

The following three cases are an exception to the rule:

1. In Christinnek's[1] case, observed at Schwartze's policlinic, the otorrhœa had lasted but two months before the appearance of the necrotic cochlea in the external auditory meatus. The patient was seized with sudden vertigo and fatigue, with pain in the right hemicranium, and vomiting of three days' duration. No loss of consciousness. After twelve weeks otorrhœa took place, with immediate abatement of the pain; a week later facial paralysis.

2. In Trautmann's[2] case the patient, aged forty-five, took ill with meningitic symptoms. Six weeks later, otorrhœa with granulations, after the removal of which the necrotic cochlea was extracted. Cicatrization. After nine months, formation of cholesteatoma. Operation. Recovery with facial paralysis.

3. In my own observation, as described above, the labyrinth was affected from the very beginning. The facial paralysis, as initial symptom with subsequent otorrhœa and simultaneous disturbances of the equilibrium, positively indicate a primary lesion. The further course of the case was, it is true, quite slow.

We must therefore in these three cases suppose a *primary* inflammation of the labyrinth ending in necrosis.

[1] Christinnek, *Arch. f. Ohrenheilk.*, vol. xviii., p. 293.

[2] Trautmann, Meeting of German Naturalists at Berlin. Section of Otology.

CEREBRAL ABSCESS AFTER OTITIS MEDIA ACUTA HEALED BY OPERATION.

By Dr. C. TRUCKENBROD, of Hamburg.

Translated by Dr. J. A. Spalding, Portland, Me.

April 8, 1891.—Mr. H., aged fifty-four, consulted me for a deafness and tinnitus of the left ear which he had perceived for the last ten days. He was very anxious about his hearing, as that of his right ear had been very poor for years (sclerosis). I diagnosticated an exudation in the left tympanum, and expressed a very favorable opinion. At a later date he recollected that the good ear began to suffer soon after the influenza. All inflammatory symptoms, such as pain, feverishness, vertigo, etc., were entirely absent. Having failed to remove the exudation by the aid of catheter and injections of iodine, I made a paracentesis of the *Mt* on April 20th, removed a large amount of serum, and on the next following days I removed still more by inflating the tube with the catheter. About the end of the month he had a furuncle in the meatus, probably due to an excoriation arising from a bit of cotton wedged too tightly in the meatus. The secretion gradually became purulent, but he still felt perfectly well. On the 2d of May while in a profuse perspiration, he ran around the corner of the street and was suddenly exposed to a violent cold wind, so that he at once perceived pain in his ear and head. Arriving home he at once took to his bed, and passed a restless night with feverishness and pain in the head. His physician directed antipyrine, on account of a temperature of 104°.

May 5th.—Consultation : pain in head ; perforation in *Mt* very small ; it was at once enlarged ; secretion abundant, creamy, and violently pulsating.

May 9th.—Perforation having contracted, was again enlarged; violent parietal pain; vertigo on attempting to stand, or on moving head; no vomiting, anæsthesia, or visual disturbances. His constant complaint was of the violent temporal pain. "There is something here; I shall not get well till that is out of the way," was his repeated remark.

May 13th.—Slight paralysis of the right facial; the patient became very garrulous, and stumbled over his words, calling Night Day, and Summer Winter, and everybody was "Thou." He could not find words for ordinary things like spoons and forks, but to suggestive questions he invariably gave correct answers. He was very cross because he was unable to think of the proper words, delighted when he could think of them, yet gradually sinking into an apathetic condition. Bodily temperature the same on both sides; no anæsthesia, no vertigo, no vomiting, and temperature not higher than 100° or 101°. Pupils and fundi normal, so too the mobility of the eyes. Dyslexia; very excitable; anarithmia; could not count further than 1, 2, 3, but he saw and recognized everybody, had no diplopia, and with each eye alone, carefully tested, he saw as well as any one. Paresis of right arm.

The diagnosis of some cerebral disturbance was clear, but whether cerebral abscess, œdema, or epidural abscess it was not easy to say. Meningitis seemed improbable. We suspected from the symptoms on the part of the right facial, the right arm, and the disturbances of speech, an affection near the left temporal and parietal lobe, and that affection probably an abscess.

A consultation with the family physician and another found this opinion confirmed. We decided to watch the patient carefully, to wait patiently for the pus, if present, to thicken, and on the appearance of threatening symptoms to operate at once. It is well worth observing at this point, that at no time during the entire course of the affection was any alteration visible about the mastoid process. The only constant symptom was the violent parietal pain.

May 17th.—Sopor. Patient hardly speaks all day long. Temperature 103°.

Longer waiting appearing dangerous and aimless, we decided

to request Dr. Schede to perform the operation, which he agreed to do at once on seeing the patient for the first time on the 18th. He agreed with the probability of an abscess, and advised that first the mastoid should be extensively opened.

Under chloroform narcosis and with all antiseptic precautions, the mastoid was opened in the usual way. There was no trace of exudation or pus, but occasionally some caseous ostitis. Nor was there any fistula or alteration in the roof of the mastoid. Nevertheless the roof was opened with the chisel, and the dura laid bare. No trace of pus being seen, the dura was divided and the brain exposed. This was very tense, but there was no pulsation or pus, although extremely hyperæmic. Exploratory puncture forward and upward with a delicate needle and syringe evacuated pus and a bright liquid to the amount of sixty grm. It was more probable that the pus in the abscess had decomposed than that the bright liquid had escaped from one of the ventricles. The orifice made by the needle was enlarged with a knife, and a drainage tube inserted. The cavity in the bone and the abscess cavity were thoroughly irrigated with sublimate (1 to 1000), the wound covered with iodoform, and antiseptic gauze laid over all.

The recovery was excellent. The feverishness, the facial paralysis, the paresis of the arm, and the intense pain disappeared at once. A day or two later the drainage tube becoming clogged, the patient's condition deteriorated rapidly, but this being removed and a larger tube inserted the rest of the recovery was ideal. By July the cicatrix was closed, the discharge from the meatus had disappeared, the perforation in the *Mt* had nearly cicatrized, and the hearing was as good as before the attack. The mental functions returned even faster, for whilst the patient's handwriting on the 2d of June had been almost indecipherable, it became legible in ten days, and in three more days he wrote long letters with ease. The only trace of the serious condition through which he has passed is visible in the quick and frequent exhaustion following a very slight amount of work.

LITERATURE.

Since I reported with Schede[1] the first permanently successful case of cerebral abscess cured by an operation, others have followed in rapid succession. First we find eight cases

[1] These ARCHIVES, vol. xv., p. 176.

by v. Bergmann [1] whose experience in cerebral surgery is so well known, and three by Braun,[2] two of them being from older literature and one by Schwartze. Next we discover one by Sick,[3] two additional cases by Pritchard,[4] a case of cerebellar otitic abscess reported by McEwen,[5] and finally a case by Hoffman,[6] the introduction of which at this place may however be doubtful, because he did not set out with the intention of opening a cerebellar abscess, though such a one was accidentally opened during the operation and with the most grateful results.

Therefore we have at present a list of seventeen successful operations for the relief of otitic cerebral abscess. And I should not omit to give all praise to Schede for having been the first to decide that it is proper and necessary and scientifically accurate to operate for an abscess so situated, and to accomplish the operation successfully in all its details.

OTITIS ACUTA.

Our case is interesting from another point of view, for v. Bergmann once said that the diagnosis is made by recalling to mind the previous suppuration; in other words, the chronicity of the case decides the presence of an abscess. But in a later edition of his monograph he suggests that cerebral abscess may originate after *acute suppuration* in the interior of the ear, mentioning cases by Schmidt and Gruber. Now, our case is one of that sort, and really the only one yet reported except a single one by Schwartze, in which the operation has been done with success after otitis acuta.

DIAGNOSIS OF THE LOCALITY OF THE BRAIN DISEASE.

The chief diagnostic point is the aphasia, which according to Wernicke indicates a disturbance in the posterior third of the first left temporal convolution of the brain. Hence we as-

[1] "Die chirurg. Behandlung von Hirnkrankheiten."
[2] "Die Erfolge von Trepanation bei dem otitischen Hirnabscess."—*Archiv f. Ohrenheilk.*, xxix., p. 161.
[3] "Aphasie durch Gehirnabscess. Trepanation. Heilung." Saenger und Sick.—*Deutsche med. Wochenschr.*, 1890, p. 186.
[4] These ARCHIVES, vol. xix., p. 140.
[5] These ARCHIVES, vol. xviii., p. 217.
[6] "Beiträge zur Hirnchirurgie."—*Deutsche med. Wochenschr.*, 1890, p. 1082.

sumed that the abscess was situated in the temporal lobe. Additionally we had the circumscribed pain in that region, throughout the entire course of the attack. The paresis of the right facial, the convulsions in the right arm, and the weakness of the right hand in contradistinction with that of the left, aided the correct diagnosis.

v. Bergmann has called attention to the fact that in cases of abscess in the temporal lobe we must remember, in addition to a general increase in pressure caused by increased tension of the cerebro-spinal fluid in the entire cranial cavity, that pressure is further propagated by the brain itself, and unevenly, so that those portions of the brain near the temporal lobe are more affected than those lying at a distance.

This increased pressure in the skull also explains the agraphia, anarithmia, and dyslexia as observed in our case. But all in all, the most weighty symptom was the *aphasia so evidently suggesting the left temporal lobe as the one affected.*

The SIZE OF THE ABSCESS can only be guessed at in these patients, and even with large abscesses, as proved at the autopsy, the patients have often suffered but little during life, the chief point being the amount of gray substance affected. Even with large abscesses the tracts often remain open and are only broadened by pressure. v. Bergmann.[1]

Moreover, since in Koerner's opinion [2] left-sided otitic cerebral abscess is rarer than right-sided, then, in case of doubt, the aphasia is a very important diagnostic point. Besides that, the autopsy has revealed in some patients a cerebral abscess on *the side that was apparently unaffected.*[3]

The diagnosis between circumscribed meningitis or some other affection in the neighborhood of the fossa Sylvii, can rarely be determined with certainty, and only occasionally by the absence of other cardinal symptoms.

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[1] Ziemssen's Handbuch, Band xi., p. 2.

[2] *Archiv f. Ohrenheilk.*, vol. xxix., p. 25.

[3] For general views on the sc-called otitic cerebral abscess, see a dissertation by Custer, Bern, 1880; Troeltsch, *Archiv f. Ohrenheilk.*, Band iv., p. 105; Rudolph Meyer, "Die Pathologie des Hirnabscesses," p. 26; and Robin, "Des affections cérébrales consécutives aux lésions non-traumatique du rocher, et de l'appareil auditif," Paris, 1883, where at page 36 five cases are cited.

THE OPERATION.

Chauvel, v. Bergmann, and v. Wagner have laid down the rules for the operation on cerebral abscesses in the temporal lobe, the first of which is the opening of the mastoid process, having in mind the fact that it is often affected in ear diseases. We may then find, for instance, caries or necrosis of the tegmen, or even a fistula, showing where the pus entered the skull, and giving a road to enter by. Although the mastoid was opened in our case, and no disease discovered, yet there were traces of former disturbances. The next step varied from the one generally advised in that, instead of enlarging the exterior incision, we chiselled away the tegmen. Next the dura and membranes were divided, the brain punctured, and, after pus was revealed, the brain was pierced with the knife up to the cavity, the exploratory syringe being used as a guide. The reaction that occasionally follows suction with the syringe has suggested to the most recent operators to abandon this instrument and to enter the brain boldly with the knife, as the dangers are but slight.

Experience alone can tell whether after all it is best to seek for temporal abscesses directly from the roof of the mastoid process. At all events it offers the advantage of leaving the entrance of the wound lower than the abscess, so that the pus flows off easier and the skull is not injured, something very advantageous to the patient.

DRAINAGE can be best accomplished with as broad a tube as possible, and perhaps it would be wiser to have one that is hard and unyielding, like silver.

If one has a good clinique and attendants the aurist ought to be able to operate as well as any one, but in private practice, where skilled attendants are rare, it may be best on the whole to summon the attendance of a skilful surgeon for the operation to be performed.

The RESULT in our case, with complete cicatrization of the mastoid and the closure of the perforation in the *Mt* and good hearing, must be considered ideal. The otorrhœa persisted in some of the cases that have been reported, and v. Bergmann cured the same by a method suggested by Kuester, which is, however, rather dangerous to undertake.

In conclusion, let us not forget the words of v. Bergmann: "Whoever knows as we do that there is no other termination to cerebral suppuration than a fatal outbreak into the ventricles, or equally fatal meningitis, must look upon the surgical opening of cerebral abscesses as the rescue from an urgent danger to life." And Sahli[1] has lately remarked: "Surgery has a more favorable future in brain abscesses than in case of brain tumors. In this province much has already been done, and with increased refinement in diagnosis much more remains to be accomplished."

I will now venture to add

brief notes of two other similar cases

in which, although the operation was properly performed, the results were unfavorable.

CASE I.—*Man, aged twenty-nine. Suppuration from left mastoid; abscess of left temporal lobe; trepanation: drainage; rupture of the abscess into the ventricle; death from meningitis.*

Pain over the mastoid. Pain began three months before, but only occasionally. Present inflammation began December 23d with pain in neck and head; temp. 103°, pulse 92; left *Mt* much injected but not much bulged forward.

On the following days spontaneous perforation of the *Mt*, violent pain in ear and head, no cerebral nerves affected, pain on mastoid-pressure, but no swelling.

December 30th.—The mastoid was chiselled open, and much pus liberated; the transverse sinus could be seen in the bottom of the incision; iodoform and salicylated-water injection into the meatus.

January 6th.—Violent pain in temporal region; no congestion-papilla; no vomiting; strabismus divergence left eye; patient dull and apathetic to questions.

January 11th.—Pulse 55, temp. 99°; very restless; ptosis of left upper eyelid; loss of sensibility over lower extremities; patellar reflex painful; congestion-papilla in each eye; diagnosis, probably cerebral abscess.

On the same day trepanation of the left temporal and parietal bone according to Wagner's method. A piece of skin and bone about 6 *cm* in diameter was tilted upward. Dura enormously

[1] "Über chirurgische Operationen vom Standpunkte der inneren Medicin," *Volkmann's Hefte*, Neue Folge, Band xxviii., July, 1891.

tense, but no pulsation; incision in dura, with puncture of the temporal lobe of the brain. A great deal of cerebro-spinal fluid and pus was evacuated. Iodoform into the abscess cavity; tegmen tympani apparently intact. The osseous flap replaced and a bandage applied.

The following day the pulse and temperature were more nearly normal, the patient clearer-headed, the strabismus and ptosis hardly noticeable, and all the symptoms more favorable. The bandages were changed from time to time.

Three days later the patient became rapidly worse. The bone was removed as soon as possible, and a second puncture of the brain made with a knife, but without giving passage to pus or other secretion from the abscess cavity. The ocular symptoms all returned even more noticeably than before, the sensibility of the cornea being remarkably low.

Without entering into all the long story of the symptoms varying from day to day, we may say that, in spite of repeated opening of the wound, of various antiseptics and internal medication, the patient's condition grew worse day by day, and he gradually fell into a comatose condition and departed on the 25th of the month, fourteen days after the operation.

AUTOPSY.

Body well developed; extreme cadaveric rigidity.

Brain substance falling through the round orifice in the bone. On removing this the pia and rest of the brain in the lower angle appear normal. Dura very dense, pia thickened, a thick layer of pus at the chiasma, and the nerves of the right side more deeply imbedded in the pus than those on the left side; the lateral ventricles filled with purulent secretion.

The part of the brain prolapsed belongs to the first and second left temporal convolutions. On uncovering the abscess cavity it is found to be very extensive, reaching out to the posterior lobe.

Nothing macroscopically abnormal in the rest of the cranial organs, the cerebellum being a little flattened, and the substance softened. The organs of the thorax and abdomen were nearly normal, the right lung alone being somewhat infiltrated in the lower lobe.

CASE 2.—*Otitis media; mastoiditis; cerebral abscess; death.*

R. H., a baker, aged twenty-five.

September, 1886.—Pain for the last week in the left ear, with

abundant suppuration. Later he informed us that he had been deaf and had suffered with a discharge from this ear for about a fortnight, and that the discharge had once ceased, then reappeared. Vomiting in the last two days; voice, close to the ear; mastoid tender; nothing to see in the swollen meatus.

Three days later, temp. 101°; loss of consciousness at times; mastoid incision, and then the chisel; pus only discovered at a great depth; excessive hemorrhage; bandage; iodoform.

Within twenty-four hours the patient was again fully conscious and his temperature normal.

The breathing ceased on the following day as the bandage was being changed; artificial respiration necessitated, and was successful; pulse good. Thinking that pressure on the brain had caused the respiration to stop, the mastoid incision was enlarged and the dura laid bare with the chisel, but no pulsation. Cheesy ostitis. The exploratory needle after being introduced several times in different directions finally gave exit to two teaspoonfuls of fetid pus when pushed upward and backward. During the entire time of the operation artificial respiration was kept up; this was for more than two hours. When the dura was exposed the respiration returned. The respiration ceased again after the patient had been half an hour removed from the operating table, and artificial respiration was again necessary. Injections of ether; wine and egg by the mouth.

On the following morning the condition of the patient grew slowly worse, and although he regained consciousness once or twice he did not rally, but passed away on the afternoon of the 18th, a week after his entrance to the hospital.

The autopsy showed the heart and lungs and all of the abdominal organs to be healthy. The drainage tube left after the operation passes through the posterior lobe of the brain as far as the tentorium, but not through it. The left cerebellum contains a small cavity filled with offensive greenish pus. Surrounding it are small hemorrhages and softening. The discoloration and softening extend across the middle line. Dura equally affected; brain of natural consistency. The left transverse sinus contains a firm red thrombus, which is softened in its upper portion and behind the sulcus, and in the sulcus itself is a layer of greenish discolored pus. Cheesy ostitis in the mastoid and the middle ear extending through the tegmen tympani. The sinus longitudinalis is free from thrombi.

REPORT ON THE PROGRESS OF OTOLOGY DURING THE FIRST HALF OF THE YEAR 1891.

By Prof. A. BARTH and A. HARTMANN.

Translated by Dr. Max Toeplitz, New York.

A.—NORMAL AND PATHOLOGICAL ANATOMY, HISTOLOGY, AND PHYSIOLOGY OF THE EAR AND NASO-PHARYNX.

By A. BARTH, Marburg.

I.—ANATOMY.

a.—HEARING ORGAN.

1. Haug, R. (Munich). The best methods of decalcification. A technico-histological sketch. *Zeitschr. f. wissenschaftl. Microscopie und für microsc. Technik*, 1891, vol. vii., p. 1.

2. Randall, B. A. The corrosive method in the study of the anatomy of the ear. *The Amer. Journ. of Med. Sci.*, 1891, vol. ci., No. 1.

3. Bouchet, R. Anatomy of the elephant's ear. *The American Lancet*, April, 1891.

4. Evle, Petrona (Buenos Ayres). Malformations of the auricle. *Inaugural Dissertation at the University of Zurich*, 1891. Zurich, Institute Orell Füssli. With 4 plates.

5. Váli, Ernst. The morphological alterations of the auricle in the normal, insane, and idiot. *Allgem. Wien. med. Zeit.*, 1891, p. 121.

6. Schwendt, A. (Bâle). Congenital malformations of the hearing organ associated with branchiogenous cysts and fistulæ. *Arch. f. Ohrenheilk.*, vol. xxx., p. 37, 1891.

7. LEWIS, A. PARK. A peculiar congenital ear anomaly. Fistula auris congenita. *Journ. Ophthal., Otol., and Laryng.*, January, 1891.

8. HARTMANN, A. The opening of the cupolar cavity. The anatomical relations in chiselling of the mastoid process as to possible injuries of the n. facialis and the labyrinth. Berlin, 1891, Fischer's *Verlags-Buchhandlung*, Atlas.

9. POLITZER, A. Cholesteatoma of the hearing organ from an anatomical and clinical point of view. *Wiener med. Wochenschr.*, 1891, Nos. 8–12.

10. AYERS, HOWARD, Director of the Lake Laboratory, Milwaukee. The membrana tectoria—what is it? and the membrana basilaris—what is its function? *Anat. Anzeiger*, 1891, p. 219.

11. HIS, W., Prof. Histogenesis and connection of the nervous elements. *Arch. f. Anat. u. Physiol.*, 1890, supplementary volume, p. 45 (very important paper—Moos).

12. HABERMANN. Hemorrhages into the labyrinth following pernicious anæmia. *Prag. med. Wochenschr.*, Sept. 24, 1891.

13. FERGUSON, JOHN. The auditory centre. *The Journ. of Anat. and Physiol.*, vol. xxv., new series, vol. v., 1891, p. 292.

14. LUYS, I. Examination of the brains of two aphasic persons and one deaf-mute (Examen des cerveaux de deux aphasiques et d'une sourde-muette). *Comptes rend. hebdom. de la soc. de biol.*, série ix., vol. iii., No. 11, p. 188.

1. Decalcification readily takes place in phloro-glucin, whereby the tissues are well preserved. One gramme of phloro-glucin is heated slowly in a 10-per-cent. solution of pure non-fuming nitric acid, and shaken, whereby the nitrate salt of dark ruby color is formed. Up to 300 grammes of decalcifying fluid can be prepared with 1 gramme of phloro-glucin by the addition of distilled water; but it should always contain 20 per cent. of nitric acid, which may be increased to 35 per cent. in the case of very hard material. Thorough removal of the acid by running water, lasting about two days, is necessary in order to obtain permanent and well-stained specimens.

4. The material examined by Rohrer was derived from 3,000 histories of cases and from 100 inmates of the house of correction at Zurich. The results are as follows: The human auricle exhibits very frequent anomalies of formation which but in a few instances can be explained as to their mode of development.

The anomalies may be divided into (forms of) arrested development, excess of development, pigment anomalies, and hypergenesis. The anomalies and their excesses are frequently found as appearances of degeneration in the insane and in criminals as the expression of an early pathological disposition of the individual. They are of especial value in connection with other malformations for the comprehension of a deficient psychical disposition. They are, however, in this respect of no other import than the other malformations of the body. The connection of the malformations with psychical defect is at present unexplained.

6. SCHWENDT describes a bilateral microtism and defect of both external meatus, complicated with an external fistula situated in the right zygomatic region, and leading into a branchial cyst in a girl, 7 years old, with fairly good hearing power. He compares his case with previous publications of other authors.

9. After a general review of the prevailing views upon the question, POLITZER describes a series of specimens of cholesteatoma of the middle ear. I shall mention only one in which the masses had almost completely filled the osseous external meatus, the tympanic cavity, the anterior portion of the mastoid, and the entire labyrinth, and had also destroyed the facial nerve. Politzer distinguishes two groups according to their development, viz., primary and secondary cholesteatomata. In the latter group are comprised those in which the mucous membrane of the middle ear has become epidermis because of the continuity (produced by the perforation of the membrana tympani) between the investment of the middle ear and of the external meatus; the process is favored by stenosis of the Eustachian tube. He admits also the possible independent metaplastic transformation of the epithelium of the tympanic cavity into epidermoidal cells. Primary cholesteatomata are of rare occurrence. We may speak of primary cholesteatomata only when the mass projects into the tympanic cavity with a free, smooth, and iridescent surface, there being no destruction of the bone, and the membrana tympani being imperforate. It may also be considered as primary when it develops during the course of purulent otitis in the gland-like depressions, lined with epithelium, of the tympanic mucous membrane. Politzer considers cholesteatoma clinically as a retention mass, which leads by its growth, but principally by its easy disintegration, to very serious affections with symptoms of inflamma-

tion and retention. The paper marks a decided progress in our knowledge of cholesteatoma.

10. Corti's membrane is a product of shrinkage, swelling, and torsion, which originates from the hair cells supported by the cells of Corti's organ. It belongs to the same category as the cupulæ terminales. The membrana basilaris cannot be considered a vibratory membrane in the meaning of Heursen-Helmholtz. The vibrating endolymph rather strikes the hair cells directly. As a physiological unity the cochlea is a sensory epithelial cell with hairs; anatomically, however, the cochlea is a group of hair- and supporting cells, or a sense organ. The questions at issue will be more fully treated in a more extensive paper.

11. We emphasize the following points from this very important paper, on page 108: "The origin of the n. acusticus is to be looked for in the bipolar ganglionic cells of the cochlear and vestibular ganglia"; on p. 110: In the macula acustica of frogs of the same age the epithelial cells at the places reached by the nerves form a panel-work with membranous boundaries on either side. The nuclei are situated at the base. In the panels are round or pear-shaped cells which project with a long filament above the surface. This stage has been preceded by another in which clear formative cells with mitotic figures were imbedded between the densely packed epithelial cells. Moos.

b.—NASO-PHARYNGEAL CAVITY.

1. HARTMANN, A. Atlas of the normal and pathological anatomy of the nose. Berlin, 1891. Fischer's *Verl. Buchhandlung*, 12 plates.

2. SUCHANNEK, H., Zurich. Pathologico-anatomical studies on rhinitis acuta, especially influenza rhinitis. *Monatsschr. f. Ohrenheilk.*, etc., 1891, p. 106.

3. MARANO, S., Naples. The nature of ozæna; historical and bacteriological investigations. *Arch. de laryngol., de rhinol.*, etc., vol. iii., p. 59.

4. STEPANOW, E. M., Moscow. The occurrence of the so-called "hyaline balls" in the tissue of mucous polypi of the nose, etc., with remarks on the hyaline bodies of rhinoscleroma. *Monatsschr. f. Ohrenheilk.*, etc., 1891, p. 134.

5. LUC. Contribution to the study of angiomata of the nasal fossæ. *Arch. de Laryng.*, December, 1890.

6. PILLIET, A. H. Notes on the erectile tissue of the nasal fossæ. *Bull. de la soc. anat. de Paris*, 1891, series v., vol. v., p. 209.

7. SCHMIEGELOW, E. A new bacterium of the mouth. Lecture delivered at the medical Society of Copenhagen, November 11, 1890. *Monatsschr. f. Ohrenheilk.*, etc., 1881, p. 102.

2. SUCHANNEK examined several cases of coryza morbillosa, of rhinitis acuta following pharyngo-laryngitis diphtheritica, and a typical case of influenza rhinitis. The chronic inflammatory conditions are characterized by the formation of bundles of connective tissue in the pars respiratoria of the lower and middle turbinated body, and of the nasal floor and septum, which push aside at places the glands and also the adenoid tissue; furthermore by metaplasia of the ciliated epithelium into cylindrical, transition, and tessellated epithelium. The hyperæmia and œdema are to be considered acute processes.

3. From the examination of the secretions of ten ozæna patients, one with atrophic and one with offensive hypersecretory rhinitis, and from experiments on animals, Marano arrives at the conclusion, that in ozæna a distinct micro-organism is constantly found, which does not appear in other forms of rhinitis, or elsewhere. It is furnished with a capsule, but is distinguished from other capsule cocci. It is identical with that described by Loewenberg. The cultures, like others, become offensive after several days; they do not, however, have the characteristic ozæna odor.

4. The hyaline bodies represent an ordinary condition in nasal polypi, adenoid vegetations, etc. They are at times much more numerous in polypi than in isolated cases of rhinoscleroma. They are therefore not of diagnostic value. Hyaline degeneration of the cells is probably an expression of the vis medicatrix naturæ, which protects the attacked organism against an unlimited increase of bacilli.

7. In the yellowish-white tonsillar deposit of a girl aged thirteen, Schmiegelow found a bacillus which in appearance and growth resembled the bacillus of glanders. It is pathogenic in mice, rabbits, and rats, apparently not so in chickens and pigeons. The author calls it bacillus anthracoides buccalis.

II.—PHYSIOLOGY.

HEARING ORGAN.

1. LARSEN, P. C., Copenhagen. Anatomico-physiological contribution to the study of the ossicula auditus. (Danish.)

2. BING, A. An analysis of Weber's experiment. *Wiener med. Presse*, 1891, Nos. 9 and 10.

3. CORRADI, C., Verona. The functional importance of the cochlea. *Arch. f. Ohrenheilk.*, 1891, vol. xxxii., p. 1.

4. LUMBROSO, G., and COEN, G. The electrical excitability of the acoustic nerve and its diagnostic value in affections of the cerebrum and of the nervous system in general. *Il segno, rivista mensile de semeiologia*, March, 1890 (rev. in *Neurolog. Centralbl.*, 1891, p. 110.)

5. QUINCKE, H. Associated sensations and allied conditions. *Zeitschr. f. klin. Med.*, vol. xxvii., 5.

1. Helmholtz, in his "Mechanism of the Ossicles and the Membrana Tympani," has pointed out, with reference to the ligam. externum mallei, that of its different fascicles the posterior is the strongest, and is most tensely stretched. The stretching of this ligament by the malleus affects, according to Helmholtz, the middle and strongest tracts of the ligam. anterius, which emanate from the spina tympanica major, and both bundles of fibres combined form the "axis ligament of the malleus." These conditions are somewhat different, according to LARSEN. Elongation of the posterior and strongest fascicle of the ligam. extern. mallei meets, "without exception," the inner wall of the cavitas tympani 1 *mm* anteriorly or posteriorly to the place where the tendon of the *m.* tensor tympani leaves the canal and turns around the proc. cochleariformis. According to Helmholtz, the stapes is not pulled by the incus in outward movements of the handle of the malleus. Larsen, with reference to this point, has carried out two series of experiments in corpses of individuals with normal hearing. He opened the cavitas tympani and vestibulum from above, so as to expose the stapedial plate from within. If the head of the malleus was moved laterally, the stapedial plate turned on its longitudinal axis, which corresponds approximately with the crista baseos stapedis. He opened in addition the canal. semicir. super. at two places. A small glass tube was hermetically introduced into one opening, a stained fluid was then injected through the second opening into the inner ear, and the second opening closed. The membrana tympani is left intact, and the Eustachian tube permeable. If outward and inward movements are made with Siegle's otoscope, the fluid rises and falls regularly in the glass tube, thus indicating a corresponding piston-movement of the stapes, since with a patent Eustachian tube a movement of the

membrana fenestræ rotundæ is to be excluded. These experiments make it appear probable that in certain affections the mobility of the stapedial plate may be entirely or partially restored.

V. UCHERMANN.

2. BING analyzes Weber's experiment in disturbances of conduction of sound and in nervous diseases, and in the two together, and rightly advocates its usefulness for the examination of the ear.

3. CORRADI has destroyed the cochleæ of forty guinea-pigs, unilaterally and bilaterally, partially and completely, and has arrived at the following conclusions: 1. After complete destruction of both cochleæ, complete and permanent deafness results. 2. Partial destruction causes in some cases complete deafness. There remains, however, frequently a certain degree of hearing power, or it returns after some time. 3. It is quite probable that the lower notes are perceived at the cupola, the higher notes at the base of the cochlea. Corradi finally adds some remarks upon the value of Weber's experiment. The author rightly emphasizes that the solution of the question involves great difficulties, and even his own experiments admit of many exceptions (Reviewer).

4. The authors, on account of their own observations, deny the diagnostic value which some investigators, principally Gradenigo, have attributed to the electric reaction of the acoustic nerve for the diagnosis of intracranial affections. On the other hand, they think more favorably of the therapeutic value of the electric treatment of the acoustic than Gradenigo.

B.—PATHOLOGY AND THERAPEUTICS.

BY A. HARTMANN, BERLIN.

a.—GENERAL LITERATURE.

1. KAYSER, R., Breslau. Report on the cases treated during the year 1890 in Professor Gottstein's private clinic for laryngeal, nasal, and aural diseases. *Monatsschr. f. Ohrenheilk.*, etc., 1891, Nos. 6 and 7.

2. HESSLER. Influenza otitis. *Arch. f. Ohrenheilk.*, vol. xxxii., p. 29.

3. HAUG. Lysol and naphthol in the treatment of aural affections. *München. med. Wochenschr.*, 1891, Nos. 11 and 12.

4. MENDOZA, F. SUAREZ DE, Angers. Colored hearing: A study of the secondary physiological false sensations, and particularly of the pseudo-sensations of colors associated with objective perceptions of the senses. Paris, D. Doin, 1890.

5. UCHERMANN, V., Christiania. Statistics of deaf-mutism in Norway. *Deutsche med. Wochenschr.*, 1891, No. 20.

6. LARSEN-UTKE, P. C., Copenhagen. Two autopsies on persons born deaf and dumb. *Nordiskt. med. Ark.*, vol. xxiii., No. 5.

1. KAYSER reports that during the year 1890, 1,893 persons were admitted to Gottstein's private policlinic, among whom were 1,005 aural and 325 nasal patients. Among the former was a child, aged two and a half years, who had acquired a suppurative otitis from measles, with severe meningitic symptoms, followed by purulent pleuritis, the pus of which contained tubercle bacilli. The patient recovered completely under proper treatment. The mastoid process was chiselled in five instances according to Schwartze's method (one of them on account of cholesteatoma). In one patient the posterior wall of the antrum was found to be carious, and the sinus was laid bare. There existed in two cases a complication with facial paralysis, and in two others the operation was followed by erysipelas; two cases were cured, and three are still under treatment. In three patients with complete deafness the cause was in one instance a fall with fracture of the base of the skull, in another, lightning close to the patient, in the third measles. Adenoid vegetations were always removed with Gottstein's ring-knife, but in some cases of elderly individuals the snare introduced through the anterior nares with simultaneous introduction of the finger into the naso-pharynx was successfully applied. A girl, aged twelve, who had been asthmatic for seven years, was cured from her asthma by the operation. Ozæna was observed principally in the female sex, and in individuals of from five to twenty years of age. Kayser considers the rhinitis atrophicans of some authors an ozæna, which has run its course, since it occurs only at the later ages, which is in accordance with the reviewer's views. In addition, three cases of traumatic purulent perichondritis of the nasal septum may be mentioned, and thirty-two cases of nasal polypi (of which two with asthma), twelve of empyæma of the antrum,

five of which were operated from the lower nasal meatus, and one from the alveola. The nasal probe bent anteriorly like a hook, was of good service in the removal of foreign bodies, a method which has been practised by HARTMANN for a long time.

KILLIAN (Freiburg).

2. HESSLER observed forty-seven cases of otitis in influenza, among which the mastoid process was opened in twelve instances. This marked misproportion is explained by Hessler, by the fact that only severe cases were sent to him, while the general practitioners themselves treated the less severe ones. The operative cases are more fully described. Recovery took place in from two to seven weeks, with the exception of one case, in which death ensued on account of general tuberculosis, two months after the operation. RUMLER.

3. Lysol was used in otorrhœa by HAUG as irrigating fluid in a 0.25 to 0.1-per-cent. solution; stronger solutions produce pain. The odor is not pleasant. Lysol dissolved in spring water presents a milky appearance, making it impossible to judge of the removed discharges. The offensive odor of the secretions is readily destroyed. Lysol is of good service in removing cerumen and epithelial plugs. For the treatment of aspergillus it is about of the same value as other antimycotics. In acute inflammations of the external meatus, and of the tympanic cavity it relieves the pain very well, especially where slight epithelial exfoliation has taken place. Its action in the form of lysol-glycerin in 0.3 to 0.5-per-cent. solutions in acute inflammation of the tympanum was questionable, in some instances even unfavorable.

The author has used powdered naphthol in otorrhœa with such success as to bring the suppuration in from six to eighteen days to a mostly complete and definite standstill and to cure it, and that even in cases which had been treated without result with the usual remedies. In complicated otorrhœa it was unsuccessful. Haug lays stress upon the point, that the naphthol should be brought in contact only with the diseased parts; erythematous places in the external meatus become readily swollen and eczematous.

The author uses it as naphthol-alcohol (1.5 to 3.0 : 100.0 alcohol absol.) in thick mucous secretions and in perforations of the upper pole. It proved to be extremely efficacious in furunculosis, instillations being made from one to two times a day; the fluid remaining from two to five minutes in the external meatus.

JENS (Hanover).

4. SUAREZ DE MENDOZA gives a complete historical synopsis, reviews the present knowledge of the subject, and analyzes the different publications, to which he adds eight observations of his own. With reference to the origin of the affection, he shares the opinion of Chabalier, who supposes a psychical disturbance approaching illusion, whilst Lussana, Rochat, and others consider it as a normal excitation of the sensory centres; Perroud considers the affection an association of ideas. In order to distinguish the five classes of secondary false sensations, the author introduces new names: pseudo-photesthesia, pseudo-acouesthesia, pseudo-phresesthesia, pseudo-gouesthesia, and pseudo-apsiesthesia, corresponding to the false sensations of sight, hearing, smell, taste, and touch. GELLÉ.

5. UCHERMANN found in Norway at the time of his investigation, 1826 deaf-mutes, 0.95 per cent. of the population, 1,028 males and 798 females. Congenital deaf-mutism existed in 51 per cent.; acquired, in 48.5 per cent.; eight were undetermined. A connection between congenital deaf-mutism and the geological condition, especially the drinking-water, could not be made out. In 50 per cent. of the cases the born deaf-mute had one or more congenital deaf-mutes among his relatives. In three cases only one parent was a congenital deaf-mute. We must refer to the original with reference to further details.

6. LARSEN-UTKE found complete or partial anchylosis of the stapedial plate in the right ear of two deaf-mute children (aged four and four and one half years) who had succumbed to diphtheria; in one specimen marked folds of the mucous membrane existed in addition.

b.—INSTRUMENTS AND METHODS OF EXAMINATION.

7. PROF. KIESSELBACH. Tuning-forks and experiments with tuning-forks. *Monatsschr. f. Ohrenheilk.*, 1891, Nos. 1 and 4.

8. GELLÉ. Semiotic value of pulsations established by the endotoscope. *Ann. des malad. de l'oreille*, etc., September, 1891.

9. CHEVAL, Brussels. The electro-acoumeter. *Réunion des otolog. et laryngol. belges*, May 17, 1891.

10. ASCHENDORF. A new hearing-tube for hardness of hearing. *Berliner klin. Wochenschr.*, 1891, No. 17.

11. HAUG. A simple aural laryngeal and nasal manikin. *Berliner klin. Wochenschr.*, 1891, No. 2.

7. By clamping the tuning-forks, in order to deaden the upper tones, their qualities are altered in various ways, as *e. g.*, the pitch, which falls with the increasing weight and rises with equal weight by displacing the weights toward the base; furthermore, the time of vibration, which increases with the smaller weight and decreases with the larger one. The tone is loudest at the place of the weight. The weight increases the longitudinal vibrations in duration and intensity over the transverse ones. This is noteworthy, since the former are conducted to the labyrinth principally through the bone, the latter through the air. A critical discussion of the value of tuning-forks follows.

KILLIAN (Freiburg).

8. GELLÉ publishes a paper, based upon his own observations, some of which are briefly mentioned. He discusses the diagnostic value of the pulsations established with the endotoscope. The latter consists, as it is well known, of a manometer glass tube, which is adapted to the external meatus, the calibre of the vertical limb being one fifth the thickness of the aural limb. It increases the excursions of the membrana tympani, and makes them visible by the movement of the column of the fluid. With this instrument the author has observed such cases, in which the objective signs did not suffice to make a diagnosis, or to explain the persistence or the return of subjective disturbances of hearing. The pulsations observed in these cases facilitated the diagnosis of the fluctuating character of the affection, and its seat in the tympanic cavity. On the other hand, the absence of these pulsations in another group of cases has assisted in confirming the purely nervous character of the throbbing felt by the patients. In most cases the drum-membrane was opaque, or the somewhat altered appearance did not admit of precision in the diagnosis of the local condition. The author sums up as follows: The endotoscope may throw light upon the circulation of the tympanic cavity. G. GELLÉ.

9. CHEVAL published last year a detailed description of his electro-acoumeter. He recommends it especially for examinations of unfitness for military service, where it will be undoubtedly of good service in exposing malingerers.

SCHIFFERS (Liège).

10. The instrument has two walls, which act as resonance sound-receivers. In his own case ASCHENDORF found his instrument to be far superior to similar ones of older construction, not

only on account of its intensifying the sound, but also by the absence of accessory noises, and its practicalness. The paper is illustrated with drawings. RUMLER.

11. The manikin constructed by the mechanic Eichenger at Munich is to be recommended, as far as can be judged from its description, and also on account of the moderate price of $4.50. RUMLER.

c.—EXTERNAL EAR.

12. LEWIS, F. PARK. A peculiar congenital deformity; fistula auris congenita. *Journ. of Ophth., Otol., and Laryng.*, January, 1891.

13. VÁLI, ERNST. The morphological changes of the auricle in the normal, insane, and idiotic individual. *Allgem. Wiener med. Zeit.*, 1891, p. 121.

14. DELSTANCHE. Case of exostosis of the right external auditory meatus. *Réunion des otolog. et laryngol. belges*, May 17, 1891.

15. PHILLIPS, W. A. Atresia of the external auditory canal. *Journ. Ophth., Otol., and Laryng.*, April, 1891.

16. BAKER, CHAS. H. A case of spurious membrana tympani. *Medical News*, May 30, 1891.

17. SPRATLING, W. P. Aural hallucinations cured by removal of foreign bodies from the ear. *Medical Record*, January 13, 1891.

18. Prof. GRUBER. Operative removal of a foreign body which had entered the tympanum during unsuccessful attempts at extraction. *Monatsschr. f. Ohrenheilk.*, 1891, No. 5.

19. SCHMIDT, TH. Clinical communications. Foreign body in the external auditory meatus. *Münchener med. Wochenschr.*, 1891, No. 16.

12. LEWIS reports the occurrence of fistula auris congenita which he had observed in four generations, in fourteen individuals altogether. SWAN M. BURNETT.

13. Of normal and healthy individuals 26 per cent. of the males and 15 per cent. of the females have not a regular auricle; among the insane and idiotic, but one half presents a normal auricle. Complete or partial adhesion between the helix and anti-helix occurs in the latter twice, or even three times, as frequently

as in the normal; and also Darwin's macacus ear and Darwin's nodules, idiotic women excepted, in whom not a single macacus ear was observed by VÁLI. POLLAK.

14. DELSTANCHE'S patient had felt four years previously in the right ear a hard tumor, which has caused neither pain nor disturbance of hearing. Two years later he experienced pain and slight discharge; these symptoms increased after a year. A hard, movable tumor existed posteriorly and upward. It was removed, and the patient's complaints soon disappeared entirely.

SCHIFFERS (Liège).

15. In PHILLIPS' case there was otit. med. suppur., with continual formation of polypi. These were removed from time to time, but finally, not having been under observation for some time, the patient appeared with the auditory canal completely filled with a polypus which was adherent all around and covered externally with integument. It was not interfered with.

SWAN M. BURNETT.

16. BAKER relates a case of purul. otitis med. chron., in which a false membrane had formed, about ¼ inch external to the position of the true membrane. It was thick, and crackled under pressure. It bled on being incised. A piece was excised and the edges of the wound cauterized, but in time the opening closed. An eyelet of hard rubber was then set in, and it has remained, giving the patient good hearing, and there is no discharge.

SWAN M. BURNETT.

17. SPRATLING relates a case where a man of twenty-eight was admitted to an asylum for the insane on account of "voices," and other aural hallucinations, which were insupportable. The hearing on the left side was reduced to watch at six inches. It was syringed, and a quantity of wax and pieces of tobacco were brought away. The "voices" left him in two days and he was discharged cured. SWAN M. BURNETT.

18. A merchant, aged twenty-five, while scratching his left external auditory meatus with a pen-holder, left its broken-off end, consisting of a wooden ball, in the meatus. After several attempts at removal by different physicians, followed by inflammatory swelling of the entire meatus, had failed, GRUBER succeeded in removing the foreign body after chiselling off the posterior wall of the external auditory meatus. The ball had lodged in the posterior portion of the tympanic cavity. Recovery. KILLIAN.

19. A peasant complained of hardness of hearing for six weeks. Diagnosis: ceruminal plug. With the syringe, besides cerumen, a cherry-pit was removed, which must have been lodged in the ear, according to the apparently authentic statement of the patient, for forty-seven or forty-eight years.

MÜLLER (Stuttgart).

d.—MIDDLE EAR.

20. Prof. Moos, Heidelberg. The relation of micro-organisms to affections of the middle ear and their complications. *Deutsche med. Wochenschr.*, 1891, Nos. 11 and 12.

21. BOTT. Three cases of otitis media acuta with acute caries of the mastoid process, following measles. *Arch. f. Ohrenheilk.*, vol. xxxii., p. 25.

22. BARCLAY, ROBERT. Abscess of the ear. *St. Louis Med. and Surg. Jour.*, January, 1891.

23. SEISS, R. W. The treatment of inflammation of the Eustachian tube. *Amer. Jour. Med. Science*, 1891, April.

24. DELSTANCHE, CHR. The use of liquid vaseline in middle-ear catarrhs. *Réunion des otolog. et laryngol. belges*, May 17, 1891, Brussels.

25. SCHEIBE, ARNO. A new modification of the treatment with boric acid in ordinary chronic suppuration of the middle ear. *Münich. med. Wochenschr.*, 1891, No. 14.

26. LINNELL, E. H. Boroglyceride in otitis media suppurativa. *Jour. Ophth., Otol., and Laryngol.*, April, 1891.

27. JAENICKE. The boric acid treatment in chronic suppurations of the middle ear, with a report on a new preparation of boric acid. *Arch. f. Ohrenheilk.*, vol. xxxii., p. 15.

28. Prof. JOS. GRUBER, Vienna. Contribution to the treatment of chronic purulent inflammation of the middle ear, with perforation of Shrapnell's membrane. *Allgem. Weiner med. Zeitung*, 1891, Nos. 1 and 2.

29. LUC. Recoveries from chronic suppuration of the tympanum following the excision of the malleus. *Bul. soc. de laryngol., otol., et rhinologie de Paris*, July, 1890.

30. COLLES, C. J. The treatment of chronic purulent otitis media by excision of the carious ossicles and the removal of obstructions in the tympanic attic. *Amer. Jour. of Med. Sciences*, May, 1891.

31. Prof. BIRMINGHAM. Anatomy of the mastoid region.

Proceedings of the Royal Academy of Medicine in Ireland, January 9, 1891.

32. SHIELD, M. On otorrhœa. *Lancet*, July 25, 1891.

33. ZAUFAL, E., Prague. Contribution to the history of operative treatment of sinus thrombosis following otitis media. *Prager med. Wochenschr.*, 1891, No. 3.

34. SHIELD, MARMADUKE. Aural polypus with mastoiditis and threatened thrombosis. Perforation. Removal of polypus. Cure. *Lancet*, February 7, 1891.

35. MAKINS, G. H. Two cases of middle-ear disease complicated by thrombosis and suppuration of the lateral sinus successfully treated. *Lancet*, June 6, 1891.

36. LANE, W. A. Inflammation of the middle-ear and complications. *Lancet*, September 26, 1891.

37. PAGE, HERBERT. Two cases of middle-ear disease; cerebral symptoms; operation. *Lancet*, August 1, 1891.

38. Contributions to the study of cerebral abscess. *Publications of histories of cases and autopsies from the military hospitals*, xii., Berlin, 1891.

39. From the official reports of the clinics, policlinics, and the pathologico-anatomical institute of the Prussian universities upon the value of Koch's remedy against tuberculosis. Supplementary volume 1891, pp. 223–237.

40. SCHWABACH. The course of purulent inflammations of the middle ear in tuberculous patients under treatment with tuberculine. *Dutsche med. Wochenschr.*, 1891, No. 20.

41. Prof. BEZOLD. The course of the suppuration in the middle ear occurring in the course of phthisis pulmonum under the influence of Koch's treatment. *Deutsche Arch. f. klin. Med.*, vol. xlvii., p. 622.

42. USPENSKY, Moscow. Lupus of the middle ear. *Medicineskoje obosrenije*, 1891, No. 8.

43. HASBROUCK, SAYER. Primary acute inflammation of the external region of the mastoid process. *Journ. of Ophthalm., Otol., and Laryng.*, 1891, April.

44. DABNEY, S. G. Fracture of the tympanic portion of the temporal bone. *Med. News*, February 28, 1891.

45. DENCH, E. B. Chronic purulent otitis media as a cause of persistent facial neuralgia. *Amer. Journ. Med. Sciences*, April, 1891.

20. We point out from the interesting paper that Moos has mentioned four paths of invasion through which the micro-organisms, found by him and others, especially the streptococcus, the various forms of staphylococcus, and the pneumonia-diplococcus *(Frænkel-Weichselbaum)* enter the middle ear. 1. Since the occurrence of congenital otitis media purulenta cannot be doubted, it must develop through the circulation. 2. The Eustachian tube permits the invasion of microbes either directly or indirectly through the nutritive canals of the connective tissue with circumvention of the ostium pharyng. tubæ. 3. The third channel is the membrana tympani, either imperforate or perforated. 4. The microbes pass through the fissura petro-squamosa, along the process of the dura mater, from the cavity of the skull into the middle ear. The microbes, after invasion into the tympanum, produce either the well-known secretory form of the middle-ear catarrh, without suppuration, or an infiltration of the mucous membrane with numerous polymorphic migratory cells, or the suppurative catarrh. The most frequent complication of otitis media acuta is the purulent inflammation of the mastoid process. The appearance of erysipelas is of interest, "whether there existed previous pharyngeal erysipelas, and the secondary middle-ear affection became the connecting link for the subsequent extension to the face and head," or the suppuration of the middle ear became the starting-point. The following are the complications in chronic suppuration of the middle ear: cholesteatoma, the ordinary and tubercular caries with or without necrosis, sinus thrombosis, meningitis, and cerebral abscess. It is impossible to reproduce in a review the interesting details of this paper, and we therefore refer the reader to the original. NOLTENIUS.

21. Second case: otitis media acuta in patient, aged five; in the stage of desquamation with extensive suppuration over the mastoid process. Bone denuded of periosteum and superficially carious. In the mastoid process yellowish granulations. Third case: girl, aged four; otalgia during the stage of desquamation, increasing until the membrana tympani was perforated; intense suppuration, swelling behind the ear. A subperiosteal abscess was found, the corticalis was softened to a great extent, the mastoid process filled with soft granulations, the sinus laid bare. All three cases made good recovery, in spite of rapid destruction.

RUMLER.

22. BARCLAY says that in abscess of the tympanum, if the

nidus of the abscess is in the malleo-incudal niche of the attic of the tympanum, a free cut is to be made through the membrana flaccida; if in the atrium also or solely, operate as well or only upon the membrana vibrans at the most bulging point; or if the bulging is uniform, operate at the postero-inferior quadrant.

SWAN M. BURNETT.

23. In the treatment of ordinary catarrhal Eustachian salpingitis, SEISS insists on a careful medication of the nose and naso-pharynx. There must be free breathing through both nostrils, and this should be secured by operative treatment if necessary, and of course perfect cleansing maintained. He has found benefit in the cirrhotic conditions of the drum cavity, from mobilization of the stapes, which he effects by making a free incision in the posterior segment of the drum-head and introducing a hoe-like instrument, and making gentle traction on the handle of the malleus or the incudo-stapedial joint. He does not favor excision of the drum-head and ossicles in the cirrhotic form, thinking it dangerous and of no utility. For necrosis of the ossicles he recommends it. He relieves annoying tinnitus by freezing the skin of the mastoid with ether or rhigoline spray at intervals of from one to six weeks. SWAN M. BURNETT.

24. DELSTANCHE applies fluid vaseline in middle-ear catarrh through the catheter. This remedy had proved itself efficacious. He uses it also in cases of adhesion of the membrana tympani, or of the stapes, to the labyrinthine wall. The contents of the syringe are energetically driven through the catheter, and the fluid in the tympanum is then scattered by a few air-douches. The patient bears the procedure very well, and experiences an improvement of hearing. The less advanced the case, the surer is the success. In exudative processes and serous gatherings in the tympanum, fluid vaseline is also quite useful. It dislodges the exudation, mixes with it, and by liquefying it more or less, and by covering the surface of the organs, prevents the formation of adhesions. This remedy may in certain cases replace paracentesis with subsequent air-douches. The injection may be frequently repeated without harm. In order to prevent exudation after paracentesis, the author prefers fluid vaseline to injection of salt solutions, which is frequently accompanied by local reaction.

SCHIFFERS (Liège).

25. The modification of the treatment with boric acid, as it is proposed by SCHEIBE, is restricted to those suppurations which

are associated with the formation of masses of epidermis (cholesteatoma), and are characterized in most cases by the location of the perforation in Shrapnell's membrane, or in the postero-superior quadrant, and consists of direct insufflations of powdered boric acid through the opening of the cavity by means of Hartmann's small antrum tube modified by Bezold. This should be preceded by radical cleansing, with injections through the antrum tube and by careful drying. Granulations, of course, are to be removed before. The procedure requires assistance, besides practice in the use of the antrum tube. The results are in some cases excellent, as is illustrated by histories of cases. The author's description in the introductory remarks of a very rare form of suppuration is of great interest. It is located principally in the region of the tympanic end of the Eustachian tube, and is characterized by slight redness and swelling and by the formation from the viscid secretions of casts of the entire osseous tube and of the niches of the tympanic floor. It is obstinate to treatment.

26. In cases of otitis med. suppur., LINNELL has found a 50-per-cent. solution of boroglyceride in alcohol very efficient in destroying odor and for disinfecting purposes generally. He also thinks that its hygroscopic power has a beneficial effect on the inflammation in relieving congestion. SWAN M. BURNETT.

27. JAENICKE is not content with the results of boric acid treatment, as it is practised heretofore, since marked recoveries are rarely noticeable. Boric acid, he argues, dissolves in too small proportion in water in order to act well upon the mucous membrane of the tympanic cavity, and the powder does not penetrate into all nooks and corners. Jaenicke has found a composition which has the same antiseptic effect as boric acid solution of equal strength, but is superior to it in being more readily dissolved. It is neutral natrium boricum, which is formed by heating equal parts of boric acid, borax, and water, and dissolves at the temperature of the room to ca. 16 per cent. The author has good results in the treatment of chronic and subacute suppurations of the middle ear and in otitis externa purulenta. RUMLER.

28. After careful disinfection of the ear, and clearing the upper tympanic cavity of retention masses and granulations by means of the sharp spoon, GRUBER plugs the entire upper tympanic space with iodoform and sublimate gauze, and leaves the plug untouched. The plug is changed only on account of pain or fever, or when saturated with discharge, or offensive. With moderate secretions it remains from five to eight days. POLLAK.

29. LUC, after a review of the publications of Kessel, Schwartze, Lucae, Baracz, Ludewig, and Stacke, states that the use of the curette in suppuration of the osseous parts of the tympanum gives the same results as in other parts of the body. By this method, when carefully applied, suppuration of many years' duration can be brought to a standstill almost immediately. This procedure, however, is in some cases not sufficient; it should then be preceded by the removal of the first, or of the first two ossicles, since they may be the cause of suppuration, and since by their removal sufficient room is given to facilitate complete curetting of the tympanic cavity without danger. G. GELLÉ.

30. COLLES relates the histories of three cases of purul. otit. med. chron., in which he removed the malleus, which was found in all cases in a condition of necrosis. The result in all was that the discharge ceased and the drum cicatrized, and the hearing was much improved. In none was the incus present.

SWAN M. BURNETT.

31. BIRMINGHAM shows that the location of the sinus may vary as much as an inch; the greatest care, therefore, is to be taken in operations in this region. In trephining the middle cerebral fossa the point of the trephine of ¾ inch should be placed ¼ inch posteriorly, and from 1¾ to 2 inches above the centre of the external auditory meatus. The antrum can be reached with a trephine, which is placed upon it in such manner that the anterior margin of the opening is as near as possible behind the ear, and the upper margin not more than ½ inch behind the upper margin of the external meatus; the trephine ought never to penetrate more than ¾ inch. He recommends as a general rule making all perforations in front of a vertical line, which runs ¼ inch behind the posterior margin of the external meatus; the latter ought to be laid bare in every case.

32. SHIELD delivered a clinical lecture on otorrhœa, in which he discusses our present knowledge, the prophylaxis, and the treatment of the affection.

33. ZAUFAL demonstrates that, as far back as in the year 1880, he has expressed his conviction that a cure of sinus thrombosis could be expected only by operation. He had then considered as necessary operative procedures, the ligation of the internal jugular vein and the opening of the thrombosed sinus. After having in 1889 reported a case in which, after trephining of the mastoid process, he had irrigated with a disinfecting solution the sigmoid sinus opened by putrefaction, and had introduced a

drainage tube into the sinus, he lays down the following plan for operation of the thrombosed sigmoid sinus in otitis : The mastoid process must first be trephined, and the sinus exposed. If the sinus is obstructed in the foramen jugulare by a firm thrombus, ligation of the jugular vein is not necessary. If it is not, the vein must be ligated, even when it is also thrombosed, below the diseased portion. The thrombosed jugularis is to be opened below the ligature and the infecting masses removed by disinfecting injections. Zaufal quotes operated cases of sinus thrombosis, two of which were operated by Lane, four by Ballance, and two by Salzer ; five of these cases recovered completely. POLLAK.

34. This is an interesting report of a case which has been treated by SHIELD in the Charing Cross Hospital, which is a marked illustration of the advantage of timely operation. In the patient, a young man, fetid otorrhœa with marked cerebral symptoms were found December 3d. On the same day an incision was made over the mastoid process, the bone was carefully entered with the chisel immediately behind the external meatus, until the antrum was reached. The drainage tube was removed on the fifth day ; the cerebral symptoms had disappeared, and, after removal of the polypus, complete recovery took place.

35. The first of the two cases reported by MAKINS occurred in a patient aged eleven, who had had measles six years before, otit. media dextra for at least one year. Three weeks before the operation there existed swellings over both mastoid processes. The right process was opened with the chisel and an attempt was made to ligate the internal jugular vein, which, on account of previous destruction, was not found. The patient was considered cured when discharged from the hospital (St. Thomas). Makins thinks that the swelling over the left mastoid, due to subcutaneous bleeding, was caused by septic absorption from the ear. The second case was that of a patient, aged twenty-seven, with scarlatina twenty-five years ago. Continuous affection of the left middle ear. On March 20th chiselling of the left mastoid process. Very firm bone without cavity. Second operation was necessary on the 26th, when the opening was enlarged into the tympanic cavity. The wound was reopened on the 28th and the internal jugular vein ligated, whereupon the patient recovered.

36. LANE considers the mastoid antrum as a secretory reservoir for providing the middle ear with the necessary secretion. Neuritis optica in affections of the middle ear require *per se* an

operation. He recommends in all doubtful cases the opening, as well as the obliteration, of the tympanic cavity by means of hammer and chisel. The best remedy for sinus thrombosis is the immediate ligation of the internal jugular vein.

37. The first of the two cases reported by PAGE concerns a patient, aged sixteen, with otorrhœa of four years' duration, which ceased, whereupon cerebral symptoms set in. The skull was open 1½ inches behind and below the osseous external meatus. A second opening was made with the trephine 1¾ inches above and behind the external meatus, from which offensive pus discharged. Healing without disturbances. In the second patient, with otorrhœa of four years' standing, the antrum was opened with the chisel behind the external meatus and pus was immediately found. The two cases illustrate that, even where marked cerebral symptoms are present, the antrum should first be opened.

38. Among seventeen cases of cerebral abscess four were due to purulent affections of the ear (cases 14–17). The last case (17) is of interest because, notwithstanding the existence of a cerebral abscess for a long period (in consequence of a preceding otitis ?), the phenomena of the affection (acute otitis and cerebral symptoms) were not noticed until the last two weeks. "The diagnostic rule of excluding the possibility of a deep-seated cerebral abscess, when cachexia and fever are wanting or have been absent for a long period, is therefore unwarranted." ZARNIKO (Berlin).

39. Among sixteen aural patients, treated in the aural clinic of Berlin (LUCÆ) with injections of tuberculin, six suffered simultaneously from phthisis pulmonum, four from swelling of the lymphatic glands, one from lupus of the face ; among five no tuberculosis was present. Tubercle bacilli could not be found in the aural secretions of these individuals. The general reaction was not of especial interest. Local reaction took place in about one half of the cases, and consisted mostly of sensation of heat, redness, and sensitiveness to pressure upon the mastoid process, slight spontaneous pain and ear noises ; in one case swelling of the mucous membrane with secretion of pus, in another case occurrence of acute otitis of the heretofore normal ear, in a third case migrating painful swelling of the face took place. Therapeutic results : mostly negative, in one case marked improvement ; in no case impairment. (Reviewer cannot convince himself from the histories of cases, that all these otitides were really tuberculous ;

in the cases 6, 13, and 4, this supposition appears quite improbable, in several others at least doubtful.) It is worthy of consideration that, in some of these cases, after the injections, slight symptoms, especially ear noises, appeared, which we supposed to form a "local reaction." From the aural policlinic of the university of Bonn (WALB), in a patient with chronic otorrhœa and tuberculous rhinitis, an extremely violent general (high fever, delirium, vomiting) and local reaction (immense swelling and redness of the entire nose and its adjoining parts, formation of crusts in the vestibula narium) were observed after the injection of 0.0005 tuberculine. Similar symptoms followed further smaller (0.0002) doses. A case of periostitis tuberculosa of the mastoid process in a boy aged fifteen, healed without trouble after the third injection, after having for weeks remained unaltered. In a patient, whose tubercular otitis was cured, otorrhœa appeared after the first injection (0.0005). Walb advises beginning with very small doses, which cause a purely local reaction; when fever is produced, the dose has been too large. From the aural clinic at Halle SCHWARTZE reports that the experiments with Koch's remedy against tuberculosis did not begin at his clinic until the end of November, 1890. The general reaction described by Koch was observed in all cases; the local reaction was in some cases extremely marked, in others not noticeable. A curative effect upon the local tubercular affection in the temporal bone, and also in the ethmoidal bone and the frontal sinuses could, of course, not be expected, considering the brief duration of observation.

ZARNIKO.

40. SCHWABACH reports sixteen aural patients injected with tuberculin, viz.—eleven for pulmonary phthisis, one for multiple tuberculosis of the bones, and four without signs of tuberculosis. These last cases never exhibited local reaction, but two showed general reaction. With reference to the other twelve cases the following points are worthy of notice: The tuberculous character of the aural affection was established in three cases by the demonstration of bacilli. (Whether the remaining otitides were tuberculous or not, does not clearly follow from the author's statements; it is doubtful in two cases, in which purely dry perforations were present.—Reviewer.) General reaction was always present, except in one patient. Local reaction was in one case (tuberculosis of bones) violent (intense swelling, sensitiveness to pressure) and redness of the mastoid region, considerably increased discharge, at times sanguinolent, at others moderate

(slight pain and ear noises). In two cases increase of bacilli. Therapeutic result: In six cases negative, in three impairment (rapid consumption, facial paralysis, meningitis, exitus), one case (tubercle bacilli in discharge) was cured. The author leaves it undecided, to what extent the course of the observed affection had been influenced by the remedy. ZARNIKO.

41. In a young man affected with severe phthisis pulmonum, unilateral suppuration of the middle ear appeared after the beginning of the injections. The course and autopsy demonstrated some appearances not observed at other places (formation of swelling extending from margin of perforation over the membrana tympani; formation of fibrinous masses of exudation; permanent presence of tubercle bacilli in the aural secretions), which the author refers to the action of the remedy. He arrives at the conclusion that reaction has taken place in this case, but it was not sufficient to allow us to expect complete recovery if it had occurred in a similar case in an earlier stage of the general affection. ZARNIKO.

42. Peasant, aged eighteen, nasal lupus. Two months ago otorrhœa dextra without pain, which had almost disappeared at the time of admission to the clinic. January 20, 1891, injections of tuberculin (how much?). No reaction in the ear. January 22d, after second injection (how much?) most intense aural pain during an entire night, then intense otorrhœa muco-purulenta. Examination by ear specialist after five days. Perforation antero-inferiorly; swelling of membrana tympani, so as to make it impossible to distinguish the handle of the malleus. Reaction in the ear did not occur until after the eleventh injection, February 15, 1891. USPENSKY found after this: "The upper third of the membrana tympani covered with nodular (tubercular), fine, miliary eruption and intensely hyperæmic." Behind the malleus two dot-shaped superficial ulcerations developed, while the hyperæmia decreased. February 20th, the membrana tympani no longer reddened, denuded of epidermis and covered at places with epidermis scales; in place of the ulcerations dot-shaped spots, reflecting the light; discharge considerable, hearing power impaired. Microscopically numerous micro-organisms (bacilli and cocci), in one case a few Koch's bacilli were found, a few leucocytes, many epithelial cells. Exitus of the case unknown. Uspensky arrives at the conclusion that in this case the tuberculin was of diagnostic value. SCHMIDT.

43. HASBROUCK describes a case in which, during a few

weeks after previous pain in and around the ear, the external region of the mastoid process became inflamed without any sign of inflammation of the middle ear. Hot applications gave temporary relief, but Wilde's incision was made, which led to complete recovery. SWAN M. BURNETT.

44. In DABNEY'S case a boy of twelve years fell and struck the left side of his head on the floor, and was unconscious for two hours. Some discharge of blood, but not of water. Some dizziness and unsteadiness of gait, and hearing impaired. Watch only on pressure. Tuning-fork (C^2) louder on mastoid than by air. Membrana tympani red. Vision in left eye impaired and optic disk on that side congested. All the symptoms disappeared and hearing improved to $\frac{2}{40}$. SWAN M. BURNETT.

45. DENCH relates the clinical history of a woman who had a persistent facial neuralgia on the left side, which, on inquiry, was found to date from the time, six years back, of an inflammation on the left ear. Examination showed a perforated drum-head and evidences of a chronic purulent otitis. This was treated and cured, and the neuralgia ceased. SWAN M. BURNETT.

e.—NERVOUS APPARATUS.

46. LARSEN, P. C., Copenhagen. Case of cerebro-spinal meningitis complicated with aural affection; death; autopsy. *Nord. medicinks Arkiv*, vol. xxii.

47. POMEROY, O. D. On some points in the pathogenesis of aural vertigo. *N. Y. Med. Journ.*, June 20, 1891.

48. WÜRDEMANN, H. V. A case of hysterical deafness. *Medical News*, February 14, 1891.

49. DABNEY, S. G. A case of Ménière's disease. *Medical News*, February 28, 1891.

50. GELLÉ. A case of deafness following mumps. *Soc. laryng., otol., et rhinol. de Paris*, June, 1891.

51. Prof. HABERMANN, Graz. Atrophy of the nerve in the inner ear. *Zeitschr. f. Heilk.*, vol. xii.

52. FERGUSON, Toronto. The auditory centre. Valuable clinical evidence as to the exact position of this centre. *Journ. of Anat. and Physiol.*, January, 1890.

46. A. R., aged 7 years and three quarters, became ill on January 25, 1890, deaf on February 2d in both ears during the

night; on February 3d, pain in the right ear; February 5th, deafness increased; February 8th, membrana tympani, on examination, lustreless. No swelling or sensitiveness around the ear. Osseous perception for the tuning-fork destroyed. February 9th, complete deafness. Afterward paralysis of the right extremities set in, with clonic convulsions and loss of consciousness. Death on March 9th. Autopsy on March 11th. Examination of the temporal bones on March 12th and 13th. Meningitis purulenta cerebro-spinalis. Os temporis dextrum: membrana tympani imperforate. In tympanic cavity and mastoid antrum muco-pus. In porus acustic. intern. pus was also found. Canales semicirculares, vestibulum, and cochlea are filled with reddish, soft connective tissue, which consists microscopically of bundles partly infiltrated with round cells in fatty degeneration, and blood corpuscles. Os temporis sinister like the right one, but the vestibule contains some pus. The nerves do not show particular alterations. The author believes that the labyrinthine affection is dependent upon the transmission of the meningitis along the aqueducts and the nerve sheaths to the soft parts of the labyrinth. With reference to the treatment of cerebro-spinal meningitis associated with aural disease, he advocates rapid and energetic antiphlogosis, calomel, etc. V. UCHERMANN.

47. POMEROY gives the histories of twenty-five cases of aural disease, in which vertigo was a prominent symptom. Among these he found chronic dry catarrh but once. He finds it frequently in aural polypi and, of course, in labyrinthine disease, and in middle-ear disease where there is pressure on the labyrinthine fluids. It was also present in cases where the drum-head was sunken. SWAN M. BURNETT.

48. In WÜRDEMANN'S case a girl had otitis med. catarrh., for which she was treated by paracentesis, catheterization, etc., and the symptoms were markedly improved. Suddenly she became totally deaf for spoken words, though she heard noises. There were areas of insensibility embracing parts of the pinna, auditory canals; and drum-heads on both sides. A strong current of electricity was applied to the ear and the neck, and a blister to the nape of the neck. In three days she began to hear. In two weeks hearing almost entirely restored, though there were still areas of diminished sensibility. SWAN M. BURNETT.

49. In the case of DABNEY a man of fifty was suddenly seized with vertigo, tinnitus, and total deafness in right ear. Later there

was nausea and vomiting. No history of syphilis, but patient was addicted to the use of alcohol. The deafness was permanent.

SWAN M. BURNETT.

50. GELLÉ reports a case under his observation of complete deafness in the left ear after mumps. No noteworthy alterations in the conducting apparatus. GELLÉ, therefore, diagnosticated nervous deafness.

51. In eleven cochleæ atrophy of the nerves was found in the base, either locally in the terminal portion or in isolated cases reaching higher into the middle turn. These cochleæ, with the exception of two, were taken from persons who were over sixty years of age; HABERMANN, however, does not believe, that senile marasmus alone had caused the atrophy in all these cases, although he admits the possibility for some cases. Twelve cochleæ presented general nervous atrophy of different degree up to complete destruction. They were taken from individuals of different ages, who had suffered partly from different middle-ear processes, partly from labyrinthine affections, tumors in the cerebral cavity, etc.; in one cochlea absence of the nerve in the upper turn, associated with general atrophy increasing toward the base, was found.

POLLAK.

52. A young man with struma had suffered for eight years from suppuration of the right ear. Two years previous to his death, symptoms of cerebral tumor of the right temporal region appeared, and during the last six months of his life deafness in the left (?) ear became complete. At the autopsy a large tumor was found, which had destroyed the first temporal convolution of the right side; the second temporal convolution was but partially affected.

f.—NOSE AND NASO-PHARYNX.

53. CARTAZ. Eczematous erythema in consequence of salol insufflations. *Bull. soc. laryng., otol. de Paris.*, June, 1891.

54. GOTTSCHALK, S. Case of anosmia after removal of both ovaries. *Deutsche med. Wochenschr.*, No. 26, 1891.

55. ROLAND. Rhinitis fibrinosa. *Réunion des otol. et laryng. belges*, May 7, 1891.

56. OLYMPITIS, M. Tuberculosis of the nasal mucous membrane (primary and secondary form). *Thèse de Paris*, 1890.

57. RAULIN. Contribution to the study of primary lupus of the nasal mucous membrane. *Thèse de Bordeaux*, 1889.

58. WAGNIER. Relations between ocular and nasal affections. *Ibidem.*

59. LERMOYEZ, M. Accidents in consequence of intranasal operations. *Annales des malad. de l'oreille*, etc., February, 1891.

60. THILLY, S. Deviations and ecchondroses of the nasal septum and their treatment with electrolysis. *Thèse de Lyon*, November, 1890.

61. SANDMANN, G., Berlin. A new method for the correction of the nasal partition wall. *Deutsche med. Wochenschr.*, 1891, No. 9.

62. GELLÉ. Extensive perforation of the cartilage of the nasal septum in typhoid fever.

63. GUYE, Prof. Contribution to the etiology of inflammation of the tympanic cavity, produced by injections of fluids into the nose. *Berliner klin. Wochenschr.*, 1891, No. 11.

64. LOEWENBERG. Otitis media following the use of the naso-pharyngeal douche. *Berliner klin. Wochenschr.*, 1891, No. 18.

65. EITELBERG, Vienna. Affections of the hearing organ following nasal irrigations and operations. *Wiener med. Presse*, 1891, No. 23.

66. USPENSKY. Two cases of hypertrophic rhinitis with disturbances of the voice, cured with the galvano-cautery. *Medicinskoje obosrenije*, vol. xxxv., No. 1.

67. MICHELSON, Koenigsberg. Naso-pharyngeal polypi. *Berl. klin. Wochenschr.*, 1891, No. 5.

68. SCHECH, Prof., Munich. Diagnosis and treatment of the diseases of the nasal accessory cavities. *Deutsche med. Wochenschr.*, 1891, No. 6.

69. ZIEM. Extraction of a broken-off irrigating canula from the antrum of Highmore. *Berliner klin. Wochenschr.*, 1891, No. 17.

70. SUAMENSKY. Contribution to the treatment of empyema of Highmore's antrum. *Medicinskoje obosrenije*, vol. xxxv., No. 7.

71. WINDLER, E., Bremen. Contribution to the diagnosis of adenoid vegetations. *Wiener med. Wochenschr.*, 1891, No. 21.

53. CARTAZ reports three cases from his private practice in which nasal eczema developed in consequence of insufflations of salol; it disappeared immediately after the detection and removal of the cause. GELLÉ.

54. GOTTSCHALK observed the entire absence of the hereto-

fore well-developed sense of smell in a virgin castrated on account of myoma. Since neither anomalies of the nasal mucous membrane nor indications of cerebral affection were present, the author believes to be justified in considering the anosmia as a reflex neurosis, pointing to the fact that the olfactory sense is readily influenced by changes in the female generative organs. The treatment with the constant current seems to confirm his view.

NOLTENIUS.

55. ROLAND observed in brief intervals, in the same family, fibrous rhinitis in a boy and a girl. The affection was cured in from two to three weeks, the membranes discharged on the eighth day, and profuse suppuration came on.

SCHIFFERS (Liège).

56. OLYMPITIS does not mention the acute form of nasal tuberculosis, of which but one case is published. The chronic form presents itself in two ways, which greatly differ clinically from each other. The first appearance of tuberculosis (primary form) develops, or it is but a concomitant sign of a more or less advanced pulmonary tuberculosis (secondary form). The primary form is more interesting, it offers more difficulty to treatment, and it presents itself most frequently in the form of polypoid tumors, which are more or less pedunculated. ; it appears especially in children, under the mask of ozæna ; it may be associated with complications in the lungs or the meninges. He recommends for treatment curetting and lactic acid.

GELLÉ.

57. RAULIN considers the lupus of the nasal mucous membrane a tubercular affection ; it occurs most frequently upon the cartilaginous septum, whereby diagnostic difficulties arise with reference to syphilis. The course is slow ; the upper respiratory tracts are gradually implicated ; symptoms of ozæna do not appear.

G. GELLÉ.

58. WAGNIER reports some observations of cures of dacryocystitis, conjunctivitis, and chronic keratitis by the removal of papilloma of the lower turbinated body, and by the treatment of chronic rhinitis and ozæna.

SCHIFFERS (Liège).

59. These accidents are of much rarer occurrence than would be *a priori* supposed, if we take into consideration the abundant vascularization of the nose and also the quantity of microbes found there ; on account of the great variety of symptoms an

attempt at classifying these accidents seems useless. We may, nevertheless, arrange them into three main groups: A. Infectious. B. Nervous. C. Mechanical.

A. Infectious accidents. The infection may have a local cause or it is transferred. As to the first cause, the habitual microbes of the nasal cavities (pneumococcus diplococcus (Friedlaender), streptococcus pyogenes, staphylococcus albus and aureus, etc.) enter the body through the entrance produced by the operation or through the intact mucous membrane, in which the trauma has retarded the normal exit of phagocytes. With reference to the second cause—viz., introduction of germs from the outside,—poorly disinfected instruments, and especially the patient's finger, are the usual agents; furthermore, the stagnant nasal secretions form a culture medium, upon which the most exhausted microbes, which always lie dormant there, may be aroused to full activity. We may then observe: Diffuse rhinitis, submucous abscesses, diphtheria of the wound, conjunctivitis, otitis media, meningitis, arthritis, pyæmia, scarlatina, relapses of diatheses, syphilis, rheumatism, and gonorrhœa.

B. Nervous accidents. They are much more frequent than the infectious ones, especially neuralgia, megrim, vertigo, swooning, disturbances of sight, asthma, spasm of the glottis, Graves' disease, general depression.

C. Mechanical accidents. Epistaxis and permanent nasal redness. G. GELLÉ.

61. After a brief synopsis of the usual methods of operation and instruments SANDMANN recommends for "the vertical protuberances, and those prominences which offer no edge for the working of the nasal saw" a file with rough and fine teeth, which is inserted into a handle bent at an obtuse angle.

NOLTENIUS.

62. GELLÉ reports a case of perforation of the nasal septum in a waiter, aged sixteen, after typhoid fever of three weeks' duration. Before and after the fever intense epistaxis had repeatedly taken place; the ulceration advanced slowly. There seemed to exist considerable local irritation, since the patient continually scratched the nostrils with the finger-nails and soiled his handkerchiefs with blood. These cases, although of rare occurrence, have been observed and published before. G. GELLÉ.

63. GUYE mentions two cases in order to demonstrate that complete occlusion of one nostril with the nozzle during syringing

is dangerous, and he lays down the following rules for the treatment: 1. The nose ought not to be forcibly syringed, especially in the early years of life, until the physician has examined the nose as to its patency. 2. The nose ought never to be injected with a syringe occluding the nostril. RUMLER.

64. In addition to Guye's paper LOEWENBERG holds that the naso-pharyngeal douche is generally not dangerous, and that for the occurrence of middle otitis blowing of the nose after the douche is responsible. The blowing, therefore, ought not to be permitted until after ten minutes. RUMLER.

65. EITELBERG warns against nasal irrigations and the snuffing up of medicated solutions into the nose, since they are frequently followed by suppurative otitis. This is also observed after removal of swellings of the nasal mucous membrane with the snare, even after simple cauterization with chromic acid of the hypertrophic lower turbinated bodies. POLLAK.

66. Two ordinary cases. The patients were singers of twenty-six and twenty years of age respectively. The voice lost its nasal timbre and its sonorousness, and clearness increased.

SCHMIDT.

67. MICHELSON will reserve the designation of naso-pharyngeal polypus exclusively for the "typical cases of hard fibromata inserted broadly at the base of the skull." Among the three cases reported Michelson operated two with the galvano-caustic snare, the third one with the choana-forceps and subsequently with the cold snare. Michelson, for the removal of nasal mucous polypi growing into the naso-pharynx, recommends the snare. He has never felt the necessity of a preliminary operation as it is practised up to date by prominent surgeons, even in multiple nasal mucous polypi. JENS (Hanover).

68. The author reproduces a lecture delivered before the laryngological section of the Tenth International Medical Congress, in which he gave a brief and clear review of the etiology, diagnosis, and treatment of this affection. He is not quite justified in believing that Hartmann's method is of the same value as the irrigation through a natural opening. In most cases the artificial opening is situated farther backward, where in some cases a foramen accessorium is found. It is interesting that the author has succeeded in curing persistent cases by establishing an acute inflammation, especially by injections of a twenty-per-cent. solution of aluminium acetico-tartaricum. NOLTENIUS.

69. ZIEM was so unfortunate as to break off in two successive cases the canula close to the maxillary margin so as to be unable to grasp it with the forceps. He succeeded in both cases in pulling it out by means of a wire-snare, which was introduced upward along the piece of the canula.

70. SUAMENSKY discusses only cases of dental origin. The regular treatment consists in the extraction of the decayed teeth and the insertion of a metal or rubber canula, which is to be occluded during the meals. Daily irrigations through the cavity with astringents and disinfectants. If no sequestra are present in the cavity the suppuration ceases after five to six weeks. Removal of the canula; healing of the operative canal. This healing, if left to itself, is the frequent cause of relapses of the affection of Highmore's antrum. When the alveolar end of the canal closes before the end near the antrum the remaining pus infects the cavity anew. In order to avoid this procedure Suamensky recommends the introduction of conical stiff rods, which are shortened 2 *mm* every four days and are entirely removed when the canal at the end near the antrum is entirely closed.

SCHMIDT.

71. WINDLER, on account of these statistics, recommends Schaeffer's criteria as extremely useful. POLLAK.

REPORT OF THE PROCEEDINGS OF THE OTOLOGICAL SECTION OF THE SIXTY-FOURTH MEETING OF GERMAN NATURALISTS AT HALLE, SEPTEMBER 21st to 25th, 1891.

By A. TRUCKENBROD, Hamburg.

Translated by Dr. Max Toeplitz, New York.

The section was opened on Monday, September 21st at 4 P.M., in the lecture room of the ophthalmic and aural clinic of the royal university, by the president, Professor Schwartze, who heartily welcomed the gentlemen present, and called attention to the number of papers to be read. Schwartze was then elected by acclamation as honorary president of the section.

The following forty-five gentlemen had registered their names :

Ulrichs, Halle.
Kiesselbach Erlangen.
Ludewig, Hamburg.
Szenes, Budapest.
Kaufmann, Hamburg.
Christeneck, Brandenburg.
Reinhard, Duisburg.
Spuhn, Crefeld.
Hauermann, Bremen.
Kayser, Breslau.
Walb, Bonn.
Joel, Gotha.
Schubert, Nuremberg.
Brieger, Breslau.
Grunert, Halle.
Robitzsch, Leipzig.
Habermann, Graz.
Wagenhaeuser, Tübingen.
Koch, Braunschweig.
Truckenbrod, Hamburg.
Boeck, Magdeburg.
Pagenstecher, Wiesbaden.
Lemcke, Rostock.
Kretschmann, Magdeburg
Rohde, Halberstadt.
Breul, San Francisco.
Stacke, Erfurt.
Moldenhauer, Leipsic.
Hecke, Breslau.
Siebenmann, Bâle.
Scheibe, Munich.
Loewe, Berlin.

Schmiegelow, Copenhagen.
Krakauer, Berlin.
Schwartze, Halle.
Panse, Halle.
Davidsohn, Berlin.
Beckmann, Heidelberg.
Hessler, Halle.
Nager, Lucerne.
Jacoby, Magdeburg.
Barth, Marburg.
Stimmel, Leipsic.
Becker, Dresden.
Wehmer, Berlin.

KIESSELBACH then read a paper: "The Correspondence of Galvanic Reaction in the Eye and Ear." The author, from a series of examinations, arrived at the conclusion that the eye and ear react in exactly the same manner to the galvanic current.

The second paper on: "Affections of the Middle Ear in Nasal Lupus," was read by BRIEGER, who had found in several cases of lupus of the nose and pharynx an affection of the middle ear, which was to be considered lupus.

In the discussion SCHWARTZE reports a similar observation, in which an affection of the middle ear was associated with nasal lupus. The autopsy, however, did not reveal a direct connection between the two affections.

Third paper, TRUCKENBROD: "A Case of Cerebral Abscess Following Otitis Media Cured by Operation." The paper is published in full in this number of THE ARCHIVES. The discussion was delayed until Tuesday, on account of the advanced hour.

SECOND MEETING, TUESDAY, SEPTEMBER 22D, 11 A.M.

President: DR. PAGENSTECHER (*Wiesbaden*).

First paper, STACKE: "Further Communication on the Opening of the Cavities of the Middle Ear by Detaching the Auricle." The author opens and cleans out the attic after detaching the auricle by a long curved incision, then cutting the external meatus transversely near the beginning of the osseous portion and enlarging the field with chisel and hammer. Then follows the excision of the membrana tympani, and the extraction of the malleus and incus. The operation is without danger, except for the possibility of injury to the facial nerve, which cannot always be avoided. The operation also is valuable with regard to the diagnosis of suppuration of the mastoid antrum, since the entire field is exposed to view. In case of suppuration of the antrum the mastoid process also should be chiselled.

After the operation the auricle is reattached by sutures. Of thirty-three cases STACKE cured nineteen; nine are still under treatment. The treatment lasted from three to nine months. The lecture was illustrated with drawings, specimens, and the presentation of patients operated according to this method, and excited general interest.

LOEWE: "A Demonstration of Instruments for STACKE'S Operation." He again recommends, as at the International Congress in Berlin, his drilling instruments for the opening of the attic and antrum, which are to be attached to a dental engine.

In the discussion SCHWARTZE emphasizes the great dangers from drilling instruments, *e. g.*, in case of the anterior location of the transverse sinus, and mentions how easily the facial may be injured. SCHWARTZE feels justified in rejecting this method completely.

LOEWE admits the danger of injury to the facial.

KRETSCHMANN thinks careful stoppage of bleeding and illumination of the field of operation very important, and therefore uses a small incandescent lamp on dull days. He makes the cutaneous incision like STACKE, but he opens first the mastoid antrum and then the attic, after chiselling off the posterior wall of the osseous meatus. The mastoid is kept open by sewing in the cutaneous flaps, and the entire defect is covered by a plastic operation.

SCHWARTZE has operated for the last ten months according to this method in chronic suppurations, which were confined to the antrum or attic, and in which chiselling of the mastoid process was not indicated. He has operated on twenty cases, four of which were cured; in one facial paralysis set in. Among the permanent cures is one case of apparently permanent cure of cholesteatoma. The after-treatment required less time than that with the lead nail—on the average, four months.

REINHARD (on malleo-incus extraction) confirms STACKE'S indications. He has operated thirty cases, seven of which are to be excluded on account of complications from the mastoid process. Of twenty-three cases in which the mastoid process was not implicated, fourteen were cured. REINHARD is more in favor of SCHWARTZE'S old method, and he does not deem it necessary to open the attic in every case.

In the discussion STACKE recommends his method (opening the attic with malleo-incus extraction) for severe cases; for

lighter cases, however, he tries first to get the desired effect by SCHWARTZE'S method. SCHWARTZE shares this view; there is danger of facial paralysis, and of vertigo and vomiting after injury to the stapes in his method also.

In the discussion of TRUCKENBROD'S paper, which had been laid over until to-day, SCHWARTZE pointed out the great difficulties in the diagnosis of cerebral abscess.

HABERMANN then read his paper on affections of the hearing organ in consequence of tabes dorsalis, with demonstration of specimens. He found atrophy of the acoustic nerve.

SCHEIBE then demonstrated various specimens and drawings of pathological conditions of the labyrinth.

THIRD MEETING—THURSDAY, SEPTEMBER 24TH, 11 A.M.

President: PROF. WALB (*Bonn*).

KRETSCHMANN presented a patient with an open mastoid cavity, who had been operated according to his method and had almost entirely recovered (still under treatment).

SCHWARTZE demonstrates a cured case of cholesteatoma with open mastoid cavity.

SCHWARTZE, in addition to STACKE'S paper, mentioned that he had observed facial paralysis in one case, and that the Fallopian canal frequently takes an abnormal course. The prolongation of the cutaneous incision to such an extent as to lay bare the zygoma is dangerous, since he has seen necrosis at isolated points in the normal squamous portion after extensive removal of the periosteum. He recommends exposing the bone to the smallest possible extent.

SIEBENMANN then demonstrated beautiful dry specimens, *e. g.*, sections through the skull, the nose, and the naso-pharynx of the new-born. He places the fresh specimens first into diluted alcohol, gradually into more concentrated, and finally into absolute alcohol, hardens them in chromic acid, places them in turpentine, and finally, for the production of his masterful corrosion specimens, pours over the dried, leathery, but porous specimens, his metallic solution. SIEBENMANN exhibited a series of fine corrosion preparations, which were much praised.

KRAKAUER spoke on multiple exostosis of the skull, with a demonstration of the exostosis of the external auditory meatus in his case. KRAKAUER removed it with the chisel after detaching the auricle.

SZENES in his paper on "Therapeutic Effects of some New Otological Drugs," discusses a few drugs, and communicates his results from their use. Furthermore he reports in his "clinical contributions" three patients, in whom after an acute otitis media had run its course in one ear, the other ear was affected with the same disease. He would suggest for this transmigration of otitis media the name, otitis media acuta migrans.

BRIEGER, in the discussion of the first paper by SZENES, considers dermatol unsuitable for the treatment of aural affections, on account of its absolute insolubility.

With reference to the second paper, HABERMANN and BRIEGER supposed that a nasal or naso-pharyngeal affection had likewise caused the affection of the second ear, since the Eustachian tube must be considered as the point of entrance.

The next paper was read by WALB, on "The Use of LUCAE's Pressure Probe in Diseases of the Middle Ear." WALB considers it very useful for mechanical treatment, and had good results when it was used for a long period, at least three months. He has also tried to glue the probe to the short process with syndeticon, in order to act by traction outward as well as by pressure. KRAKAUER combines massage and catherization in such manner that the outward bulging of the membrana tympani, produced by inflation of air through the catheter, is intensified by aspiration from the external auditory meatus.

JOEL recommends for this purpose a rarefying apparatus, which should always be applied by the physician and never by the patient.

STIMMEL has also tried LUCAE'S probe in sclerosis, but without improvement of the hearing in any case. He has observed, however, diminution of the tinnitus. He began with three-pressure movements, which he gradually increased to twenty.

WALB makes one hundred pressure movements, beginning with twenty, later twice a day, and his results have lately been better, since he uses more energetic treatment.

WEHMER had in most cases no beneficial result, in isolated cases slight improvement. One case, which had been treated by another physician, improved in the beginning, but rapidly grew worse.

SCHWARTZE considers tragus-compression just as successful as the pressure probe.

STIMMEL frequently uses tragus-compression ; he has observed, however, but two beneficial results.

JOEL asked the gentlemen present their results with ASCHENDORF'S hearing tube.

WALB had not seen any good result from its use in nearly one hundred cases.

KRAKAUER also had not observed the slightest benefit in fifty cases.

SCHWARTZE considers the end-piece for insertion into the external meatus badly devised; he has had in a few cases good results, after the end-piece had been modelled after a plaster cast.

BRIEGER had good results with an apparatus made from a plaster cast.

LOEWE then read his paper on "Blennorrhœa of the Middle Ear." He recommends plugging the tympanic cavity, and if this is unsuccessful and pus is discharged from the antrum or attic, he makes a canal with his trephining machine and plugs this canal. (The reviewer hopes that his example will not be followed.) In small perforations of the membrana tympani he circumcises it and thus enlarges the perforation, since the movable membrana tympani is pulled inward by the malleus.

HECKE reports, in his "Contributions to the Cure of Metastatic Pyæmia in Diseases of the Middle Ear," two cases, which recovered in spite of the severity of the affection. In the first case the caries of the mastoid process was complicated with pleuritis, with suppuration in the sterno-clavicular and shoulder joints. In the second case the caries of the mastoid process was cured, leaving a permanent fistula. The other ear also became affected after a cold, and caries of the other mastoid, with an inflammation of the elbow-joint, set in. This case was also cured after operation.

In a fatal case the pyæmia and caries of the mastoid developed after extraction of a foreign body. An operation could not be performed on account of bilateral pneumonia.

HECKE read also a paper on "Extradural Suppuration in the Course of Middle-Ear Affections." In two cases the pus was removed by operation. The first case died from meningitis. The course of the second case was quite favorable, and the patient was about to be discharged from the hospital when he suddenly died from meningitis.

HESSLER, in one hundred cases of chiselling, found the dura mater exposed in seventeen cases, fourteen of which recovered, and in four, abscesses were discovered. He found in the

literature on the subject fifty cases of extradural abscesses, of which fourteen recovered. Death ensued in the remaining cases partly from sinus phlebitis, partly from meningitis and cerebral abscess. Hessler demonstrated a specimen.

BRIEGER demonstrated an apparatus for rapid sterilization of water during operations.

At the conclusion of the meeting WALB expressed the thanks of the section to Prof. SCHWARTZE, and also to the secretaries, Dr. SZENES, Dr. GRUNERT, and Dr. PANSE, for the management of the executive business.

SCHWARTZE expressed his thanks to all the gentlemen of the section for their zeal, and especially to those who had come from a distance. He hoped that everybody took something home with him for the benefit of the patients, and he wished that the next meeting at Nuremberg in 1892 might be as well attended.

Reviews.

The Anatomical and Histological Dissection of the Human Ear in the Normal and Diseased Condition. By Dr. ADAM POLITZER. Translated from the German by GEORGE STONE. London, Ballière, Tindall, & Cox., 1892.

The specialty of otology is rapidly moving to the front. Among those, either in Europe or America, who have contributed to its advance, Politzer of Vienna undoubtedly stands foremost. Every department of otology has been illumined by his labors. As a teacher, as a scientific worker, as a therapeutist, as a pathologist, his services have been unrivalled.

Here we have his latest contribution, and it is a most valuable piece of work. Indeed, its appearance may be said to mark an era in scientific otology. Since Toynbee's time no work on the pathological anatomy of the ear of equal importance has appeared. It was much needed, for from ordinary treatises on pathology little help can be obtained in aural pathological anatomy, and the otologist, anxious to cultivate this field, must have felt very much the want of such a guide as the one before us.

Politzer first describes and figures the necessary instruments. The various methods of removing the organ of hearing are then described, as well as the examination of the cranial cavity and brain in connection with the cavities of the ear. The author then proceeds to demonstrate the macerated temporal bone first in the new-born infant and then in the adult ; the sections described give excellent views of the relations of the cavities and canals of the ear to one another, as well as to the cranial cavity and blood channels in the vicinity. In the infant the peculiarities of the antrum mastoideum and the osseous part of the external auditory canal are admirably demonstrated and illustrated with wood-cuts ; the gap in the tympanic plate, existing in the early years of life, is shown to be of considerable pathological importance.

A large part of the work is of course devoted to the various anatomical and pathologico-anatomical preparations of the organ. The modes of examining the middle ear are given in great detail. The relation of the upper tympanic cavity, or malleo-incudal niche, to the antrum in connection with those purulent diseases of the middle ear attended by perforation of the membrana flaccida, is pointed out. This dissection is of especial value in view of the recent methods of treating cases of suppuration in the upper tympanic cavity by surgical removal of the malleus or of both malleus and incus. The examination of the inner wall of the tympanum, especially of the fenestral regions, is of great importance. The capacities of these recesses, especially of the niche of the fenestra ovalis, present great differences in normal ears—in some, spacious, in others, strikingly narrowed, so that the crura of the stapes may be in immediate contact with the inferior or lateral walls of the niche. As Politzer remarks: "There is no doubt that such a congenital narrowness of the niche of the fenestra ovalis favors, in inflammatory processes of the lining membrane of the middle ear, adhesions of the crura of the stapes with the niche of the fenestra."

The sections of the mastoid process are very instructive, especially the horizontal ones. Politzer is of opinion that only in 36.8 per cent. are the mastoid cells throughout pneumatic. In the majority they are either partly pneumatic and partly diploëtic or diploëtic altogether. On these horizontal sections the relations of the lateral sinus to the antrum, to the external surface of the mastoid process, and to the external auditory canal are very clearly demonstrated. Numerous measurements made by Politzer on horizontal sections showed that the distance from the antero-superior part of the outer surface of the mastoid process (the seat of operation in opening of the antrum) varies between 6 and 15 *mm.* The varying situation of the sinus in relation to the external surface of the mastoid process and posterior wall of the external auditory canal is shown on numerous sections. In a proportion of cases "the groove of the sinus is found considerably deepened, strongly curved, and in its middle and upper portions arched so far outwards and forwards, that between it on the one side and the posterior wall of the meatus, as well as the external surface of the mastoid on the other side, merely a narrow bridge of bone is present." This relation of the sinus, so unfavorable for operating, is chiefly met with in temporal bones with

a diploëtic or sclerotic structure. The author also very properly emphasizes the importance of the relation of the mastoid cells to the incisura mastoidea in view of the occasional escape of pus into this incisura, with burrowing of the pus under the sterno-mastoid muscle and fascia of the neck.

The preparation and dissection of the osseous and membranous labyrinths are described minutely. These sections are beautifully and clearly illustrated. In this connection details are given of the difficult task of exposing and examining the two interesting ducts which connect the labyrinthine cavities with the cranial cavities, namely, the aquæductus vestibuli (ductus endolymphaticus), and the aquæductus cochleæ (ductus perilymphaticus). Interesting historical references are given regarding their discovery. These ducts are most easily exposed on decalcified temporal bones or by the corrosion process.

A series of valuable preparations are described specially for instruction purposes. One of these is a frontal section through the entire skull and brain (firmly frozen), in the frontal plane of the two external meatuses. The study of such a section is important, in view of the operative treatment of otitic cerebral abscess. Politzer gives the various diameters of the temporal lobe above the middle ear as measured by him on several preparations of frozen sections of the skull and brain.

A valuable chapter is that devoted to the preparation of casts of the cavities of the ear by corrosion. Although this process has been practised since the beginning of the century, it has lately been brought to the front by Bezold in his treatise *Die Corrosions-Anatomie des Ohres*, München, 1882. The process, by boiling in wax and resin and then decalcifying with hydrochloric acid, yields excellent casts. In order to render those casts more capable of resistance, Politzer has devised a plan of covering them with a galvano-plastic layer of copper. In this way beautiful casts are made of the labyrinthine cavities. The metallic casts are, of course, most suitable for demonstration. The various alloys are here described, and the details of the process are so carefully gone over that any one may be able, after some practice, to prepare for himself most interesting and instructive casts.

The histological examination of the ear (oto-histology) receives all the attention which its importance and difficulty demand. The processes of fixing and hardening, of decalcification, of embedding

and sectioning, of staining and mounting, are described in great detail. For fixing and hardening, chromic acid and its salts are preferred. Urban Pritchard's fixing fluid, composed of chromic acid, alcohol, and water, is recommended as suitable. Decalcification of the petrous bone is a most important preliminary to sectioning, and the other processes of histology. Politzer prefers nitric acid ($3\frac{1}{2}$ parts of nitric acid, $\frac{3}{4}$ of a part of chloride of sodium, and 100 parts of water) as the best decalcifying agent. This solution should be used in large quantities and should be renewed every day. An alcoholic solution of hydrochloric acid is good, if the object is only to obtain topographical sections, but, on account of its injurious action upon the labyrinthine structures, this acid is not suitable for histological examination. For embedding the structures suspended in the cavities of the temporal bone before section, no substance is so efficient as celloidin, dissolved in absolute alcohol and sulphuric ether. When it sets, this solution completely surrounds all the tissues and retains them *in situ*. For sectioning, Politzer makes use of the automatic sliding microtome of Reichert, of Vienna. The staining methods preferred by Politzer are carmine, eosin, and hematoxylin. For staining bacteria on sections he recommends Löffler's "universal bacteria staining" method. By this process the sections, after being perfectly freed from acid, are left for five or ten minutes in an alkaline solution of methyline blue.

After going over all the general processes connected with otohistology, the author takes up the various parts of the ear in order, beginning at the auricle and ending at the central course of the auditory nerve in the brain. In each case he describes with great detail the normal and pathological histology. His most difficult task is the histological examination of the membranous labyrinth. The preparation of good microscopic sections of this most intricate part of the ear requires very great experience, and it is very properly recommended that, at first, the organs of hearing in the lower animals, such as in young guinea-pigs, should be employed. Immediately after the death of the animal the organ should be placed in the chemical fluids necessary as preparations for the sectioning. In regard to the histological examination of the terminal apparatus in the cochlea, the most instructive sections are those through the modiolus from base to apex, and those directed vertically to the long axis of the modiolus. These should be examined with a lower power, in order to see well the two scalæ,

cochlear canal, and the terminal apparatus of the auditory nerve. For the details of Corti's organ, a higher magnifying power is necessary.

The volume concludes with a very complete and valuable account of the literature of the subject. The illustrations, consisting of 164 wood-cuts and one plate, are numerous and most helpful. These illustrations, in very many cases, depict specimens taken from the author's own collection.

A most important service has been performed by Mr. Stone in placing this work before his English-speaking *confrères.* The task undertaken by him in its translation into English was no easy one, when we consider the technical character of the subject, and the difficulty of avoiding errors in the numerous details and measurements. The task has been well executed, and Mr. Stone deserves the grateful thanks of all those interested in the study of otology for the labor and time which he must have expended upon this translation. THOMAS BARR.

Textbook on Otology. By Dr. F. ROHRER, of Zurich. Published by Deuticke, Leipsic and Vienna. 1891. Reviewed by A. BARTH, Marburg. Translated by Dr. MAX TOEPLITZ, New York.

The textbook is industriously and, in spite of its abundant contents, concisely written. Differences of opinion are thus less marked. On the other hand, the style of writing is more adapted to those who do not intend to enter too fully into the details of otological study. The value of the book will not be detracted from by emphasizing a few points which might be corrected. The representation of the methods of examination appears to the expert somewhat pedantic. Their execution would require an infinite amount of time and labor. This refers also to the tables appended to the work, according to which histories should be written. I prefer to get the full history (p. 32) after the objective examination. I would advise the illumination with reflectors *before every* introduction of instruments. In examinations with the tuning-fork, a more distinct statement of the tones would make the matter clearer. A large number of the drawings of the membrana tympani might be somewhat less schematic in the outlines of the malleus. The drawing of Lucae's catheter is not exact. The illustration representing the atrophy of the membrana tympani is not clear (p. 110). I should not like to endorse the following sentence: "The membrana tympani is not elastic, but firmly and rigidly stretched"; and I should not speak of the

proper tone of the drum-membrane. The statement that the air conduction of sound takes place in atresia of the external meatus through the Eustachian tube (p. 79), is at variance with the author's views upon abnormal patency of the tube (p. 176). The Burckhardt-Merian cotton applicators cannot be recommended, because they are much too long. Lucae's water balloon[1] and Lucae's olive-shaped attachment to Politzer's bag are practical and worthy of consideration. In the treatment of eczema (p. 71), moisture is possibly to be avoided, or the parts should be well dried after cleansing, or dry treatment and ointments are to be used. In the latter treatment, grease or lanolin should be added, since pure vaselin is frequently irritating. In applications of ice to the external ear (p. 73), I would add some precautions, since the cold frequently cannot be borne, and the auricle may be frozen. Pyoktanin is an unreliable and irritating disinfectant. Cocaine seems to be too frequently recommended; its action through the intact cutis is quite doubtful; its prolonged use in swellings for treatment is without effect and frequently harmful. On the other hand, I have seen good results from its use in acute irritation of the nose and middle ear, when applied temporarily for a few days upon the nasal mucous membrane. In the treatment of circumscribed otitis externa (p. 88), I would have expected, instead of the unreliable menthol, rather the plugging with aluminium aceticum (or a 1 per mille solution of sublimate) as the most efficacious method. I would not permit the patient the use of a wiper or even of an ear-sponge (p. 88) for cleansing, this not being in accordance with the beforementioned difficulty of disinfecting instruments. Whether the discharge is to be considered as "exudation *ex vacuo*" (pp. 107 and 173), is very doubtful. The reviewer thinks the posterior dulness in the intermediary zone of very rare occurrence. The most frequent seat of dulness is at the margin of the membrana tympani and around the umbo. For the explanation of the frequency of otitis media in infancy (p. 124), most authors mention in the first place the processes of degeneration. With reference to the treatment of carcinoma, (p. 161) the radical operative removal is worthy of mention, so long as it can be carried out. I generally agree with the author's views on cholesteatoma, but I do not understand why out of consideration for some authors it should be given a duplex character. In perforations in Prussak's space, or in Shrapnell's membrane (p. 167), the seat of suppura-

[1] *Arch. f. Ohrenheilk.*, vol. xx., p. 167.

tion is frequently separated from the tympanic cavity proper, so that paracentesis at the lower margin of the membrana tympani does not facilitate the discharge of secretions. The very brief description of the naso-pharynx and its affections necessitates a reference to other textbooks on the subject. The operative opening of the mastoid process (p. 182) is very briefly dispensed with. The reviewer, in contradistinction to the author, appears to believe that this operation, with its after-treatment, belongs rather to the province of the aurist than to that of the general surgeon. The influence of quinine and salicylic acid upon the inner ear is occasionally mentioned, but it deserves a fuller discussion because of its not rare occurrence. I feel obliged to emphasize again that diplacusis (p. 215) is due at least in the majority of cases to affections of the sound-conducting apparatus, and that double hearing is only hearing in a different timbre.

The foregoing remarks treat only of the more important points that struck me in reading. They are, however, as I emphasize again, not directed against the book as a whole. I am rather convinced, that the book answers its purpose completely, and is to be highly recommended to the student as well as to the general practitioner. If I may express a desire, I should not like to have later editions larger, but rather, if possible, more abbreviated. On the other hand, on account of its conciseness, a complete bibliography would be welcome to many readers.

Microphotographic Atlas of the Normal and Pathological Anatomy of the Ear. By Dr. L. KATZ, Berlin. Published by Hirschwald, 1891. Reviewed by S. MOOS, Heidelberg. Translated by Dr. MAX TOEPLITZ, New York.

"The atlas will be published in three parts, which will contain photographic illustrations of the most important pathological conditions of the hearing organ, and also the normal histological conditions of the ear, which are partly still subject to controversy." The first part, already published, contains ten photographs. The three first represent Corti's organ in the cat and dog with its annexes and details, the fourth a transverse section of the stapes and vestibule of the rabbit, the fifth a stapedial anchylosis in man, the sixth a new formation of bone (probably after a trauma in childhood) in a cochlear turn with atrophy of the acoustic nerve in the cochlea, the seventh a longitudinal section through the ampulla of a cat, the eighth the lamina reticularis of the cat with both rows of rods, the ninth the pathological condition of the labyrinth with stapedial anchylosis in a deaf-

mute boy, seven years old, and the tenth the pathological condition of a semicircular canal in a deaf-mute.

This number is excellent as regards most of the illustrations. The method gives, topographically, at any rate, the best results. As to *finer cellular* details, some illustrations are excellent; this depends, of course, on the thickness of the sections. The illustration of the crista of the cat, for example, leaves much to be desired in the details of the nervous epithelium. The author and the publisher deserve, at any rate, great credit for the enterprise. Photography will not entirely replace lithography. We recommend the work very highly to our special colleagues.

MÜLLER: **Lip-Reading—A Guide to the Study of the Art of Reading Spoken Words from the Mouth.** 160 pages. Hamburg: Published by the author (Hansaplatz 2). Reviewed by S. Moos, Heidelberg. Translated by Dr. MAX TOEPLITZ, New York.

This work is not adapted, as the author himself emphasizes, for the personal use of the deaf, but is a guide for teachers in institutions for deaf-mutes, or for those who instruct deaf-mutes, or for deaf persons, who desire to learn to read the spoken words from the mouth. The first part of the book contains the following subdivisions: Instruction in lip-reading for deaf-mutes, the position of the deaf in the method of instruction for deaf-mutes, the instruction in lip-reading suitable for persons with difficulty of hearing, and the method of speaking before the pupil. The remaining part contains exercises. We may gratefully accept this work offered by a layman, since it completely fulfils the promises given in the title.

MISCELLANEOUS NOTES.

The co-editor of these ARCHIVES, Dr. Moos, has received the title of honorary professor in the University of Heidelberg.

For the cultivation of aural science and art **The New York Otological Society** (private; membership limited; meetings at the houses of the members, with a social finale) has recently been organized in New York City. Four meetings annually, viz., on the third Tuesday of November, January, March, and May. On the day of its organization the Society counted twenty-nine members, and elected, for the present year, Dr. Albert H. Buch, President, Dr. E. Grüning, Vice-President, Dr. E. B. Dench, Secretary.

NOTES FROM GREAT BRITAIN.

SOCIETY MEETINGS.

MANCHESTER MEDICAL SOCIETY.—At the meeting held on November 4, 1891, Dr. Milligan read a paper upon the treatment of attic suppuration by excision of the auditory ossicles. The paper subsequently appeared in the *Lancet* of January 16th, and an abstract of it will be found in our Report of the Progress of Otological Science.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—At the meeting held on November 6, 1891, Dr. Thudicum read a paper "On the Entrance of Polypi of the Ethmoid Cavity into the Orbit and Antrum, and their Progress in the Train of Ethmoid Abscess."

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—At the meeting of January 8, 1892, Mr. Richard Lake exhibited microscopical sections of aural polypi.

EDINBURGH MEDICO-CHIRURGICAL SOCIETY.—"On Cystic Tumors of the Throat, Nose, and Ears," a paper read by Dr. P. McBride at the meeting of December 2, 1891.

MANCHESTER PATHOLOGICAL SOCIETY.—Wednesday, December 9, 1891. Dr. Milligan showed an interesting specimen from a case of meningitis following chronic suppurative middle-ear disease. The mastoid antrum had been opened and scraped, but the patient, a boy aged seven, died ten hours after the operation. At the post-mortem pus was found in abundance at the base of the brain, over a portion of the left cortex, and along the sheath of the auditory nerve.

NEWCASTLE-ON-TYNE CLINICAL SOCIETY.—At the meeting of Thursday, November 26, 1891, Dr. W. Robertson showed, among other cases, two of mastoid disease.

BRITISH MEDICAL ASSOCIATION, ABERDEEN, BANNF, AND KINCARDINE BRANCH.—A meeting of this branch was held at Aberdeen on November 18, 1891. Dr. Mackenzie Booth showed a case in which he had opened the mastoid antrum with the chisel. The patient, a girl aged ten, was suffering from mastoid abscess; the symptoms were relieved immediately, and the patient was well in a fortnight.

BRITISH MEDICAL ASSOCIATION, BIRMINGHAM AND MIDLAND COUNTIES BRANCH.—At the meeting of this branch on January 28th, Mr. Heaton showed a case in which there was congenital malformation of the right ear and lower jaw. The external meatus was absent, but there was some evidence of the existence of a middle and internal ear; the auricle was represented by two small nodules in front of the depression in the skin which marked the position of the meatus.

LONDON POST-GRADUATE MEETINGS.—On January 21st, at the London Throat Hospital, Great Portland Street, Mr. W. R. H. Stewart gave a demonstration on the examination of ear cases.

On January 28th, at the same institution, Dr. Edward Law demonstrated the examination of throat and nose cases.

On February 18th Mr. Stewart lectured on some complications of chronic middle-ear suppuration.

CANADIAN MEDICAL ASSOCIATION.—This association held an enthusiastic meeting in the autumn of last year. At that meeting Dr. Proudfoot read a case of occlusion of the auditory meatus by hyperostosis, and Dr. Stirling one on cerebral abscess following mastoiditis, in which he had operated with complete success.

APPOINTMENTS.

BARRETT, J. W., M.B., B.Ch. [Melb.], F.R.C.S. [Eng.], has been appointed assistant surgeon to the Eye and Ear Hospital, Victoria, South Australia.

RYAN, J. P., L.R.C.P., L.R.C.S. [Ireland], has been appointed surgeon to the Eye and Ear Hospital, Victoria, South Australia.

BULL, W. C., M.B. [Cantab.], F.R.C.S. [Eng.], has been appointed aural surgeon to St. George's Hospital, in the place of Sir William Dalby, resigned.

SHAW, C. E., M.A., M.D. [Ireland], has been appointed surgeon in charge of the Eye, Ear, and Throat Department of the Ulster Hospital, Belfast.

BEQUESTS.

Under the wills of the Brothers David and Francis Smith of Glasgow, a sum of £10,000 has been distributed among the local charities. The Glasgow Ear Hospital receives £100.

The late Mr. Newbon of Islington, the senior member of the firm of auctioneers and valuers, bequeathed large sums of money to the local and metropolitan charities; the Central London Throat and Ear Hospital receives £1,000.

The Royal Ear Hospital of London has received a legacy of £100, under the will of the late Mrs. Amelia Ballard.

MISCELLANEOUS.

A new department for the treatment of diseases of the eye, ear, and throat has been established in connection with the Ulster Hospital, Belfast, to which Dr. Cecil Shaw has been appointed.

In addition to his ordinary course on aural surgery, Dr. Thomas Barr has this session given three lectures in Professor Sir George Macleod's course on systematic surgery.

In a letter to the *British Medical Journal* of December 5, 1891, Mr. A. H. Tubby suggests a plan for correcting the deformity due to outstanding ears. He removes a piece of skin from behind the ear, divides and grooves the cartilage of the concha, and then draws the opposing raw surfaces together by means of two or three deep sutures.

A general practitioner, writing to the *Lancet* of January 2d, warns us against a possible danger that may arise from the use of badly constructed binaural stethoscopes. Quoting his own case as an example, he tells us how, by the accidental slipping off of one of the ivory ear-pieces, the unguarded end of the metal tube was thrust forcibly through his membrana tympani, with results that all aural surgeons may readily imagine.

By the much regretted resignation of Sir William Dalby, the authorities of St. George's Hospital have lost the active services of one of the most able and successful aural surgeons in London, and the medical school one of their most charming lecturers. The vacancies thus created have been filled by the appointment

of Mr. Bull, while by a graceful compliment on the part of the committee Sir William Dalby himself has been unanimously recommended for appointment as consulting aural surgeon.

Among the new instruments connected with aural surgery which have recently been introduced may be noted: (1), a combined nasal, aural, and ophthalmic speculum, figured by Mr. G. H. Wade in the *Lancet* of November 14, 1891; (2), an improved tonsil guillotine described by Dr. Morison in the *British Medical Journal* of January 16th; (3), an improved aural speculum and head-rest described by Dr. Ward Cousins in the *British Medical Journal* of January 16th under the head of an "Improved Method of Examining the Auditory Canal and Membrana Tympani"; (4), a pair of nasal scissors designed by M. W. J. Walsham on the principle of the ordinary "crocodile" forceps, figured in the *Lancet* of February 13th.

"Soft Papilloma of the Ear of Suspected Infectious Origin." This is the title of a short note by Mr. Richard Lake in the *Lancet* of January 9th, in which he gives an account of an interesting case that had recently come under his notice. The patient was a girl of seventeen with a history of purulent discharge from the ear of some years' standing, and in whom three papillomas were discovered, attached respectively to the tragus, the anti-tragus, and the concha. Their infective nature was suggested by their appearance, by the character and odor of the discharge, which was very similar to that seen in gonorrhœal warts, and by their relative position, the growths of the tragus and anti-tragus being obviously secondary to the one on the concha.

Sir William Dalby, in a short note to the *Lancet* of February 20th, summarizes his experience as to the effect of influenza upon the middle ear. He finds that while primary affections of that organ are comparatively rare under these circumstances, it is, on the other hand, the rule rather than the exception to see exacerbations of pre-existing inflammatory mischief, or even the lighting up of long-dormant middle-ear trouble.

Among other contributions to aural literature may be noted an article upon adenoid growths of the naso-pharynx in children, their effects and treatment, in the *Canada Lancet* of December, 1891, and a paper on the same subject by Mr. Marsh in the *Birmingham Medical Review* for November, 1891.

Ulster Eye, Ear, and Throat Hospital.—At the twenty-first annual meeting held on February 15th, it was announced that 179 in-patients and 1,336 out-patients had been treated during the past year. Clinical instruction is now given to the students of the Belfast Medical School.

The thirty-fifth annual meeting of the Bradford Eye and Ear Hospital was held on February 20th, when a very satisfactory report was presented to the subscribers, both in respect to the work done by the charity, and also with regard to its financial position. The number of new patients was 4,113, of in-patients, 517, while the income for the year exceeded the expenditure by upwards of £200.

OBITUARY.

It is with regret that we record the death, on February 3d, of **Sir Morell Mackenzie**. Although at the last his death occurred somewhat suddenly, it cannot be said to have come altogether as a surprise, for it was well known to his friends that his was precisely the constitution in which an attack of influenza, the malady to which he practically fell a victim, gave rise to the greatest anxiety, and called for the most serious and guarded prognosis. A great, one might almost say a tremendous worker, his physical powers were by no means commensurate with his mental activity, and of late years especially he had developed a tendency to these bronchitic troubles, for the relief of which he made repeated journeys to the Mediterranean and other health resorts.

Sir Morell Mackenzie's contributions to the literature of his subject are too numerous and too well known to give in detail, and their value is indicated by the frequency with which his opinions are quoted, and in the majority of instances confirmed; his was essentially "the pen of the ready writer," for he possessed the somewhat rare faculty of presenting his views in an extremely lucid and attractive manner, consequently such works as his "Diseases of the Throat and Nose" will probably long rank as classics in his particular department of practice.

But in addition to his professional attainments, Sir Morell Mackenzie had a singularly charming manner, so that it is hardly surprising that his success should have been rapid and complete, and that his death will be regretted by a very large circle of personal friends. He was buried at Wargrave on February 8th.

Recent controversies are still so fresh in the memory of the

present generation as to render it almost impossible for us to form an accurate or even a just estimate of the position which will subsequently be assigned to Sir Morell Mackenzie in medical history. In this country, as the pioneer in the study of diseases of the throat and nose, his position was unique, and there can be no doubt that his claim to be considered the leading laryngologist and rhinologist of his day can never be seriously disputed. That his general position in the world of medicine was not such as might have been expected in one of his decided ability, was due rather to the unacceptable character of his views upon matters of professional etiquette and such subjects, than to the existence of any doubts as to his skill.